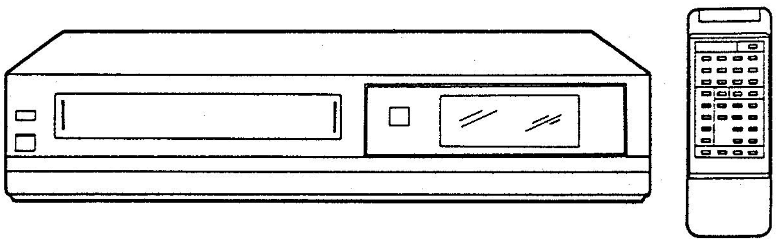
SERVICE DATA

FILE NO. 030 - 294

TOSHIBA

COLOR VIDEO CASSETTE RECORDER

V-800SR



SPECIFICATIONS

GENERAL

Video recording system:	Head configuration 2-head rotary
Video signal:	CCIR standard, PAL color
Storage temperature:	-20° to +60°C (-4° to +140°F)
Operating temperature:	5° to 40°C (41° to 104°F)
Antenna:	75-ohms external aerial terminal for UHF

Channel coverage:

	PAL D	SECAM D/K	PAL B/G
VHF	C1 - C12	R1 - R13	E2 - E12
UHF	C13 - C57	21 - 69	21 - 69

a total of up to 49 preselected channels

AERIAL output signal:	PAL G: UHF channel 31-39, PAL K: UHF channel 21-26
Power requirement:	AC 110-240V, 50/60Hz
Power consumption:	23W
Weight:	5.8kg
Dimensions:	430 x 88 x 353mm (W/H/D)

VIDEO

Input:	VIDEO LINE IN: Phono-type connector, 1.0V (p-p), 75-ohms unbalanced, sync negative
Output:	VIDEO LINE OUT: Phono-type connector, 1.0V (p-p), 75-ohms unbalanced, sync negative
Signal-to-noise ratio:	Better than 43 dB (SP)

AUDIO

Input:	AUDIO LINE IN: Phono-type connector, more than 47 k-ohm, -8 dBs
Output:	AUDIO LINE OUT: Phono-type connector, less than 4.7 k-ohm, -6 dBs
Frequency response:	80 to 8 kHz
Signal-to-noise ratio:	Better than 42 dB

TAPE TRANSPORT

Tape speed:	PAL: SP: 23.39 mm/sec, LP: 11.70 mm/sec. NTSC: SP: 33.35 mm/sec, EP: 11.12 mm/sec.
Maximum recording-time: (PAL only)	SP: 4 hours (with E-240) LP: 8 hours (with E-240)
Fast forward time:	Within 6 min. (E-180)
Rewind time:	Within 6 min. (E-180)

TIMER

Fluorescent digital display

Caution: Copyright Act 1956 Users of video recording equipment should note that it may be unlawful to record television broadcasts, cinematograph films or video recording without the permission of the relevant copyright owner.

Design and specifications are subject to change without notice.

PRINTED IN JAPAN July, 1990 Ⓢ

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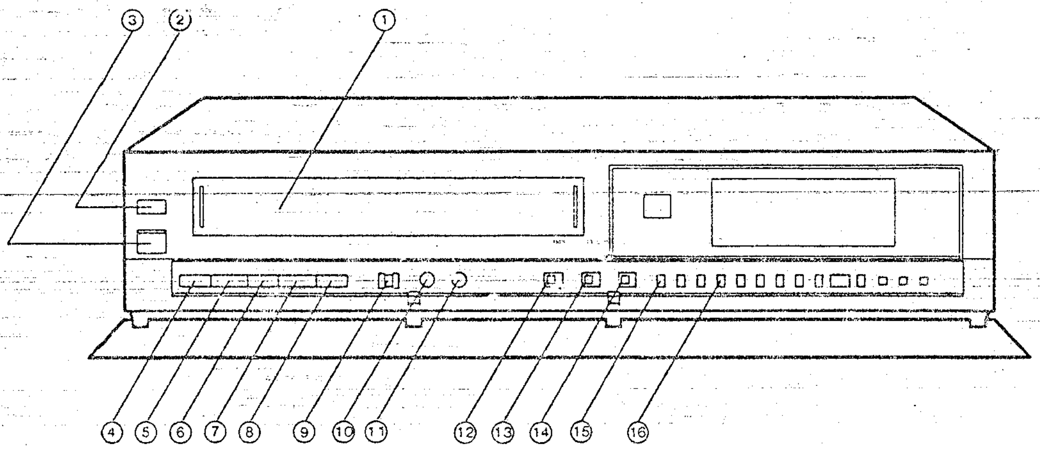
SECTION 1
GENERAL DESCRIPTION

OPERATING INSTRUCTIONS

FRONT PANEL



FRONT PANEL

① **Cassette Compartment**
Slide the cassette into the unit until the mechanism draws it in automatically.

② **EJECT button**
Press this button to remove the cassette when the power is on and off.

③ **ON/STANDBY button**
This button is used to turn the VTR on and off.

④ **Rewind button (REW)**
Press this button to rewind tapes. During the playback mode, pressing this button will allow you to play tapes in reverse rapidly.

⑤ **PLAY button**
Press this button to play back a pre-recorded cassette. The PLAY indicator comes on. Frame advance can be performed while in the still mode.

⑥ **Fast forward button (FF)**
Press this button to fast forward the tape. During the playback mode, pressing this button will allow fast forward playback.

⑦ **STOP button**
Press this button to stop the tape or interrupt the fully-automatic function.

⑧ **PAUSE/STILL button**
Used to operate the VTR in three different ways:
A) To temporarily stop the tape in the recording mode.
B) To view a still picture in the playback mode.
C) To advance the picture frame by frame, by using the PLAY button after this button is pressed.

⑨ **Record button (REC)**
This is used only for a recording in the PAL/MESECAM system, in the SP/LP recording speed mode. NTSC recordings are not possible.

⑩ **TRACKING control**
This control can be used when the DT switch is set to the "OFF" position.
Use this control during playback to adjust the picture and eliminate or reduce noise.

⑪ **PICTURE control**
To make the picture sharper, turn the control clockwise; to make the picture softer, turn the control counterclockwise.

⑫ **DT (digital tracking) switch (ON/OFF)**
ON: Tracking is automatically set for an optimum condition.
OFF: Use this position when you cannot obtain an optimum tracking setting position if this switch is set to the "ON" position.

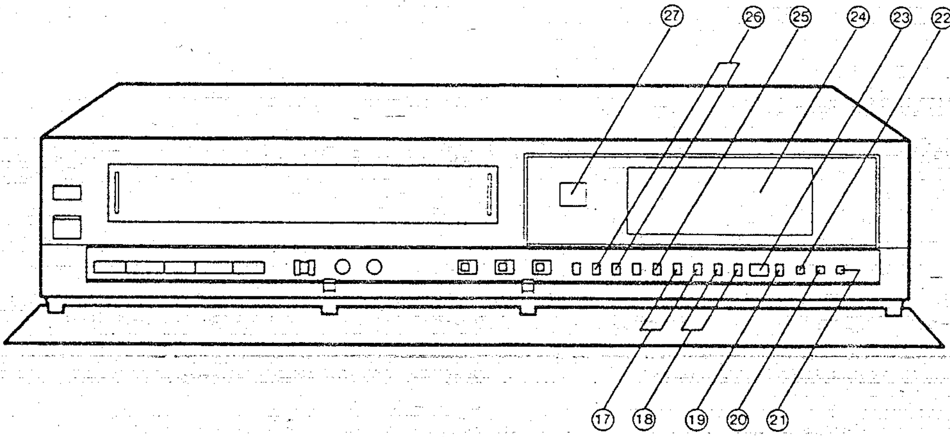
⑬ **RENTAL/EDIT/HQ Switch**
RENTAL: For playing back a rental tape.
EDIT: Set in this position when copying.
HQ: When recording in this position, enabling distinct picture for recording and playback. We recommend this position for recording.

⑭ **TAPE select switch**
PAL mode
Use the E-180 position when using a shorter tape than an E-180 video cassette.
Use the E-240 position when using an E-240 video cassette.
NTSC mode
Use the E-180 position when using a shorter tape than a T-120 video cassette.
Use the E-240 position when using a T-160 video cassette.

⑮ **PGM button**
Used to start programmable timer operation.

⑯ **SKIP button and CFM button**
Used to skip the desired channels in channel presetting. Also used to check the previously inputted programme data. Once this button is pressed, the programme scanning starts to continuously show the contents of the programme on the fluorescent display.

FRONT PANEL



FRONT PANEL

⑰ **SEARCH (+/−) buttons and SET (+/−) buttons**

SEARCH (−) button: This button is used for channel presetting. The tuning channel moves to a lower channel by pressing this button.

SET (−) button: This button is used for date, clock and timer programme setting. The digits counts down by pressing this button.

SEARCH (+) button: This button is used for channel presetting. The tuning channel moves to a higher channel by pressing this button.

SET (+) button: This button is used for date, clock and timer programme setting. The digits counts up by pressing this button.

⑱ **FINE (−/+) buttons and SHIFT (−/+) buttons**

FINE (−/+) buttons: Used for channel presetting. When you want to move to a lower channel, use the FINE (−) button to fine tune. Use the FINE (+) button when you want to move to a higher channel for best possible reception.

SHIFT (−/+) buttons: These buttons are used for date, clock and timer programme settings. Use the SHIFT (+) button to change the setting position to the next. Use the SHIFT (−) button to change the setting position to the previous.

⑲ **Recording tape speed select button**

(SP/LP) (PAL/MESECAM system)

When set to the SP position, recording in the SP (Standard Play) mode is possible; when set to the LP position, recording in the LP (long play) mode is possible.

⑳ **PRESET button**

Used to preset the channel.

㉑ **CLOCK SET button**

Used to set or reset the VTR clock and date. When this button is pressed once, the unit enters the clock set mode. When the button is pressed again after setting the VTR clock, the VTR clock starts to work.

㉒ **CLEAR button**

Used to cancel the programming data that has been preset to programme numbers 1 through 8. After pressing the PGM button, select the blinking programme number to be cancelled with the SET (+) or (−) button them press the CLEAR button to cancell the data.

㉓ **TIMER button**

Used to enter the timer mode. To release the timer stand-by mode, press it again.

㉔ **Fluorescent display**

㉕ **OTR button and SYSTEM button**

OTR button: Used to perform recording in 30-minute periods in normal mode. (Up to 4 hours)
Used to specify the timer-off time in units of 30 minutes in the timer mode.

SYSTEM button: This is used to switch the frequency tables for PAL/SECAM B.G, SECAM D.K and PAL D only when the PRESET button is pressed to ON.

㉖ **Channel select button (up and down)**

Used to select the specific channel which you wish to view or record.

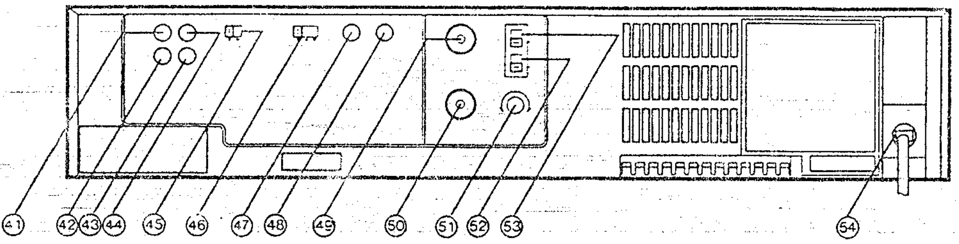
Down button (∨): When this button is pressed once, the channel digit decreases by one.

Up button (∧): When this button is pressed once, the channel digit increases by one.

㉗ **Infrared remote control receiver**

This sensor is used for receiving infrared signals from the Remote Control Unit.

REAR PANEL



REAR PANEL

㊶ **VIDEO IN socket**
For connection to a video output line.

㊷ **VIDEO OUT socket**
For connection to a monitor TV or a video input socket.

㊸ **AUDIO OUT socket**
For connection to a monitor TV or an audio input socket.

㊹ **AUDIO IN socket**
For connection to a audio output line.

㊺ **TV SELECT switch**
(NTSC 4.43/PAL 60 (NTSC ON PAL))
Used when playing back NTSC recorded tapes.

㊻ **VIDEO SYSTEM Switch**
(AUTO/PAL/NTSC)
Only used for playback.
Select the correct position depending on the tapes to be played back.

㊼ **V-LOCK control (for NTSC video tape)**
Adjust this control to minimum when the picture jitters vertically in the STILL mode.

㊽ **V-LOCK control (for PAL/MESECAM video tapes)**
Adjust this control to minimum when the picture jitters vertically in the STILL mode.

㊾ **AERIAL IN socket**
Connect the aerial lead to this terminal.

㊿ **AERIAL OUT plug**
Connect this terminal to the socket on the TV.

(51) **UHF CHANNEL control**
The output from the VTR to your television receiver can be adjusted to any channel from 31 to 39 by using a screwdriver.

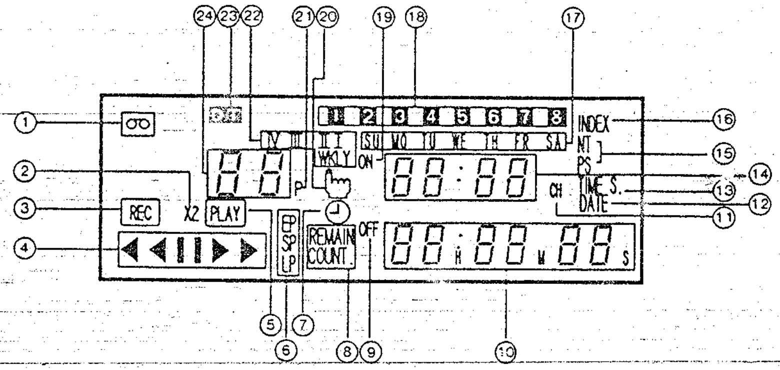
(52) **RF modulator system switch (G/K)**
Select the "G" or "K" position according to the TV set connected to this VTR.

(53) **TEST SIGNAL switch**
Provides a test signal to assist you to tune your television receiver to the output of the VTR.

(54) **Power lead**
Connect to wall AC outlet AC110 ~ 240V, 50/60Hz.

Note:
For the IN sockets of above items ㊶ and ㊹, the VTR is automatically switched into the line input mode immediately after the external pins are inserted into these sockets.

INDICATORS



INDICATORS

① **Cassette indicator**
The lamp is lit when a cassette is loaded, even when the power is off. The lamp flashes when a tape is being inserted or ejected.

② **X2 indicator**
Lights when the X2 button is pressed.

③ **REC indicator**
Lit when the unit is in the rec mode or rec pause mode.

④ **Multifunctional indicators**
See the indicator's table below.

Indicator's table

Play PLAY ▶	Still PLAY ❚❚	Record REC ▶	Double Speed Play X2 PLAY ▶
REW ◀◀	FF ▶▶	Frame PLAY ❚❚▶	Slow PLAY ❚▶
Reverse Picture Search PLAY ◀◀	Forward Picture Search PLAY ▶▶	Recording Pause REC ❚❚	

⑤ **PLAY indicator**
Lights when the unit is in the play mode, still mode, slow play mode, double speed play mode, frame slow mode, fast forward picture search mode or reverse picture search mode.

⑥ **Tape Speed indicator (EP/SP/LP)**
EP: Lights when an NTSC video cassette recorded in the EP mode is played back
SP: Lights when an NTSC or PAL/MESECAM video cassette recorded in the SP mode is played back. Also lights when the VTR is in the SP recording speed mode. (PAL/MESECAM)
LP: Lights when a PAL/MESECAM video cassette recorded in the LP mode is played back. Also lights when the VTR is in the LP recording speed mode.

⑦ **Timer indicator**
Lights when the TIMER button is pressed.

⑧ **REMAIN/COUNT. indicator**
Indicates what mode the unit is in when the REMAIN/COUNT. button is pressed.

⑨ **Timer end time indicator (OFF)**
Lights during timer end time setting operation, and when the CFM button is pressed.

⑩ Shows the current date, the timer programme end time, counter display, tape remain time as well as the time search setting time.

⑪ **Channel indicator**
Lights only when presetting the channel.

⑫ **DATE indicator**
Lights when setting the date.

⑬ **Time S. indicator**
Lights when the TIME SEARCH button is pressed.

⑭ Shows the VTR clock time, timer programme start time and channel setting display.

⑮ **Video system indicator (NT/PS)**
The "NT" indication lights when the VTR is in the NTSC system mode. The "PS" indication lights when the VTR is in the PAL/MESECAM system mode.

⑯ **INDEX indicator**
Lights when the INDEX button is pressed.

INDICATORS

⑰ **Day indicator**
Shows the current day for the VTR clock and the day when the timer programme will begin.

⑱ **Programme number indicator**
These lamps indicate the programme number into which a programme setting has been entered when setting the programmable timer.

⑲ **Programme timer start time indicator (ON)**
Lights during timer start time setting, and when the CFM button is pressed.

⑳ **OTR indicator**
Lights during one touch recording.

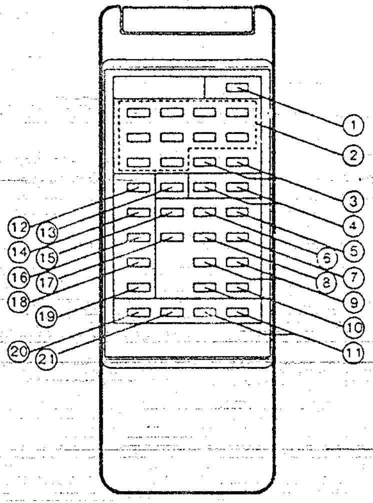
㉑ **Channel position indicator**
Lights when selecting the channel positions in channel presetting procedure.

㉒ **Week indicator**
Lights when setting the week (I → II → III → IV → WKLY).

㉓ Lights when the VTR is in the digital tracking mode.

㉔ Shows the channel position number in channel presetting and channel number in timer programming and TV channel selection.

REMOTE CONTROL UNIT



① **ON/STANDBY button**
This button is used to turn the VTR on and off.

② **10 keys**
10 keys: Used to directly select the desired channel. When you select channels 1 to 9, combine the 0 key and any of the keys 1 to 9 to make channels such as 01, 02, 03, etc.
Also used to specify the index number when performing index skip search.

③ **Channel select buttons (up/down)**
When the up button is pressed, the channel will change to a higher channel. When the down button is pressed, the channel will change to a lower channel.

④ **Record buttons (REC)**
Press to start recording. The REC indicator comes on. When recording, be sure to press the two buttons simultaneously.

⑤ **Fast forward button (FF)**
Press this button to fast forward the tape. During playback mode, pressing this button will allow you to play tapes in fast forward mode.

⑥ **STOP button**
Press this button to stop the tape.

⑦ **X2 button**
Used to playback a tape at a speed double the normal play mode.

⑧ **PLAY button**
Press this button to play back pre-recorded cassettes having a safety tab or restart playing back the pre-recorded cassettes without a safety tab after the fully automatic function was interrupted. Press this button to advance a picture in the still mode.

⑨ **SLOW buttons**
This button is used to slowly play back the picture. Use the 1/12 button to perform the 1/12 slow playback. Use the 1/6 button to perform the 1/6 slow playback.

⑩ **SLOW TRACKING buttons**
In the slow mode, if the noise appears on the screen, keep pressed these buttons until you obtain the best possible image on the screen.

⑪ **TIMER buttons**
Used to make the VTR enter the timer mode, especially for the one-touch timer recording. When doing the timer recording, be sure to press the two buttons simultaneously.

⑫ **INDEX button**
Used to perform index search and index skip search.

⑬ **EE button**
Used to operate the EE switching function.

⑭ **TIME SEARCH button**
Used to have the VTR enter the time search function mode.

⑮ **Rewind button (REW)**
Press this button to rewind tapes rapidly. During the playback mode, pressing this button will allow you to play tapes in the reverse direction rapidly.

⑯ **ZERO RETURN button**
Used to rewind or fast forward the tape around "0H00M00S" position that is set with the RESET button.

⑰ **PAUSE/STILL button**
Used to operate in three different ways:
A) To temporarily stop the tape in the recording mode.
B) To view a still picture in the playback mode.
C) To advance the picture frame-by-frame by using the PLAY button after this button is pressed.

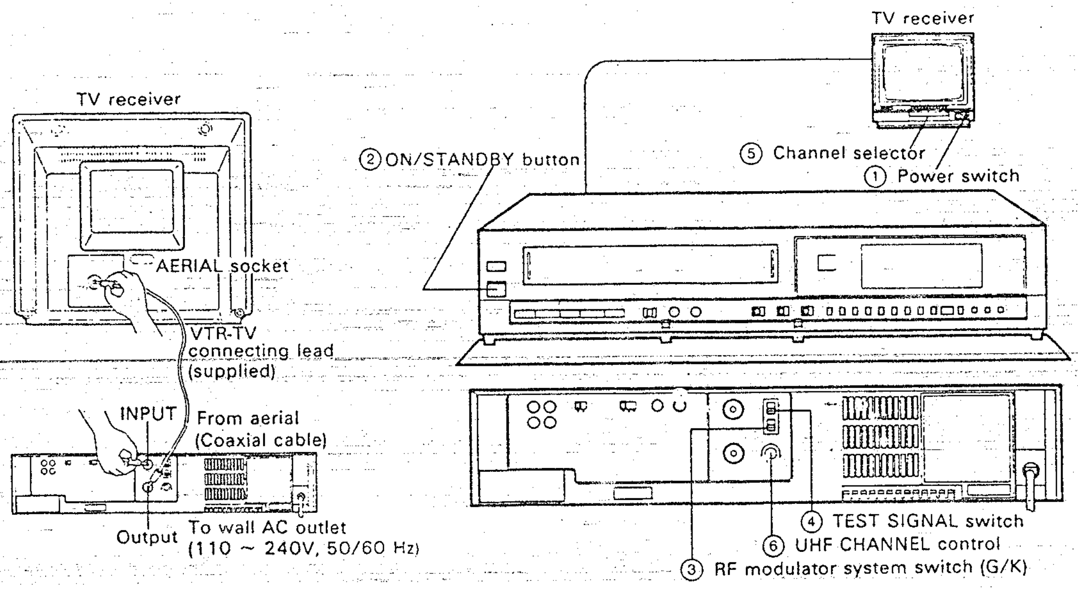
⑱ **REMAIN/COUNT. button**
Used to switch between the counter display and tape remain display.

⑲ **COUNTER RESET button**
Used to reset the counter reading.

⑳ **Recording Tape speed button (SP/LP)**
Used to select the recording tape speed.
(PAL/MESECAM)

㉑ **OTR button**
Used to operate the one-touch timer recording in periods of 30 minutes (up to 4 hours).

AERIAL CONNECTION/TUNING ADJUSTMENT


TV receiver
AERIAL socket
VTR-TV connecting lead (supplied)
INPUT
From aerial (Coaxial cable)
Output
To wall AC outlet (110 ~ 240V, 50/60 Hz)
TV receiver
② ON/STANDBY button
⑤ Channel selector
① Power switch
④ TEST SIGNAL switch
⑥ UHF CHANNEL control
③ RF modulator system switch (G/K)

TV AERIAL CONNECTION

Remove the aerial lead from the rear of your TV receiver and plug it into the socket marked AERIAL INPUT at the rear of the VTR.

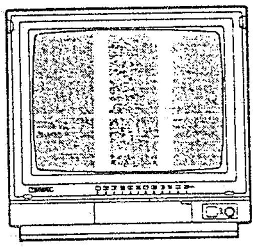
VTR-TV CONNECTION

Connect one end of the lead supplied to the aerial socket of your TV receiver and the other end to the plug marked AERIAL OUTPUT at the rear of the VTR. Note that the ends of the lead are not the same, so that only one end will fit the television aerial socket.

TUNE YOUR TV TO THE VTR OUTPUT CHANNEL

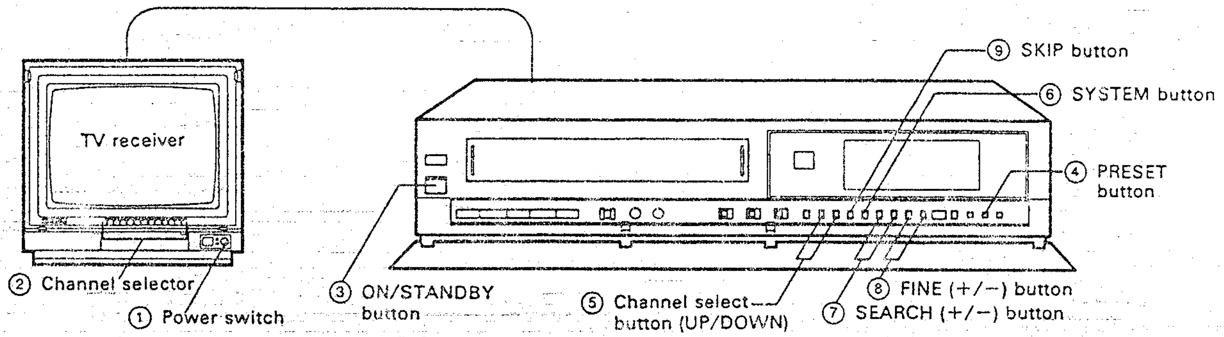
The RF converter changes the video and audio signals from a previously recorded video tape during playback to the same type of signal used in TV broadcasts. The RF converter output in this unit may be set between 31 and 39. Since accurate adjustment to the RF converter output is required to obtain the best possible reproduction on your TV receiver, perform the following directions very carefully.

1. Turn on the power switch ① of the TV.
2. Set the ON/STANDBY button ② of the VTR to ON.
3. Set the RF modulator system switch ③ to "G" or "K" according to the reception system of the connected TV set.
4. Set the TEST SIGNAL switch ④ to ON. (Your VTR will now be supplying a test signal to the TV receiver. The test signal is on a channel between from 31 through 39.)
5. Select the VTR output channel on the TV channel selector ⑤. Tune the channel until the black and white test pattern as shown below is clearly displayed. The VTR channel on the TV must be selected any time a video cassette is played back on the VTR.



6. However, occasionally you might experience interference from an adjacent broadcast channel. This can be overcome by changing the output channel of the VTR, and this is done by tuning the UHF CHANNEL control ⑥ on the rear panel. Retune your receiver to suit the new VTR output channel.
7. Set the TEST SIGNAL switch ④ to OFF.

CHANNEL SELECTION

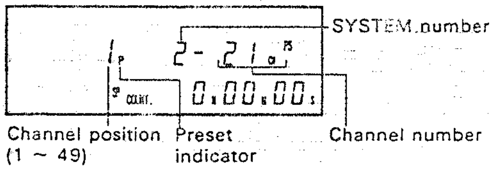

TV receiver
⑨ SKIP button
⑥ SYSTEM button
④ PRESET button
② Channel selector
① Power switch
③ ON/STANDBY button
⑤ Channel select button (UP/DOWN)
⑧ FINE (+/−) button
⑦ SEARCH (+/−) button

Since the FS (Frequency Synthesized) tuner is built into this VTR, it is necessary for you to select the stations broadcasted in your area and keep them in memory.

Aerial Coverage Table

	PAL/SECAM B.G	SECAM D.K	PAL D
SYSTEM NO.	1–	2–	3–
VHF	E2 – E12	R1 – R12	C1 – C12
UHF	21 – 69	21 – 69	C13 – C57

Fluorescent display


SYSTEM number
1 P 2- 21
COUNT. 0.00.00
Channel position (1 ~ 49)
Preset indicator
Channel number

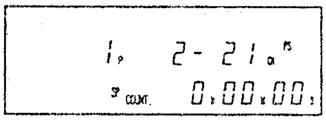
AUTOMATIC TUNING AND MANUAL TUNING

This VCR uses two tuning systems; one is an automatic tuning system, the other is a step-by-step (manual) tuning system.

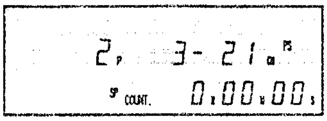
In general, use the automatic tuning system. If there are any channels which the automatic tuning system cannot search, use the manual tuning system.

Example: Setting SECAM D.K UHF station (ex. 26ch) in position 2

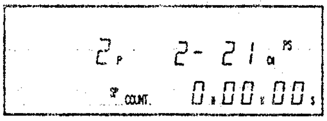
1. Turn on the power switch ① of the TV and set the VTR output channel on the TV channel selector ②.
2. Press the ON/STANDBY button ③ to ON (Light ON).
3. Open the VTR front door.
4. Press the PRESET button ④.


1 P 2- 21
COUNT. 0.00.00

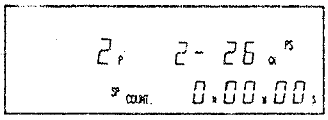
5. Set the channel position to be preset using channel select buttons (up/down) ⑤ or the number keys on the remote control unit .... "2"


2 P 3- 21
COUNT. 0.00.00

6. Select the system number which meets all the requirements of the stations that broadcast in your area with the SYSTEM button ⑥ (For this example, select system number 2–).
   Selecting the system number with the SYSTEM button ⑥ allows the system number to be changed to "2".

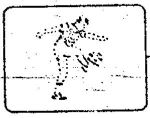

2 P 2- 21
COUNT. 0.00.00

7. Set the channel you wish to tune in. Press the SEARCH (−/+) buttons ⑦ longer. The channel will go down or up by one from the lower channel depending on the button pressed. If the received signal is tuned in, scanning operation stops automatically. If the scanned channel is not the one you want to store into memory, press the SEARCH (−/+) buttons ⑦ to restart channel search operation.
   If you do not preset the channel which you want to keep in memory, using the above operation, press the SEARCH (−/+) buttons ⑦ step by step (press by press) until the picture of the channel you want to keep in memory will clearly appear on the screen.
   - Press the + button to search higher frequency stations.
   - Press the − button to search lower frequency stations.

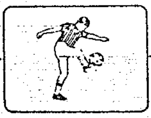

2 P 2- 26
COUNT. 0.00.00

CHANNEL SELECTION

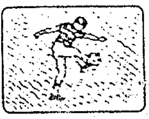
8. If a good picture does not appear after searching, make fine adjustment using the FINE (−/+) buttons ⑧.



Press the "+" button until colour appears.

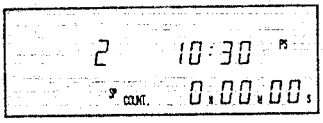


Best picture



Press the "−" button until the stripes disappear.

9. Repeat steps 5 to 8 (up to 49 positions).
10. Press the PRESET button ④. When the button is pressed, the display enters the counter mode showing only channel position number.

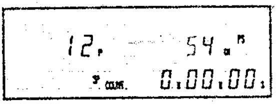


Channel skip operation

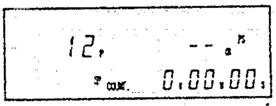
This function enables you to skip the channel positions you do not want to select when selecting the channel positions with the channel select buttons (up/down).

1. Press the PRESET button ④.
2. Select the channel position you want to skip with the channel select buttons (up/down) ⑤.
3. Press the SKIP button ⑨. The indications shown below will appear with the SKIP button on or off.

Channel skip off



Channel skip on

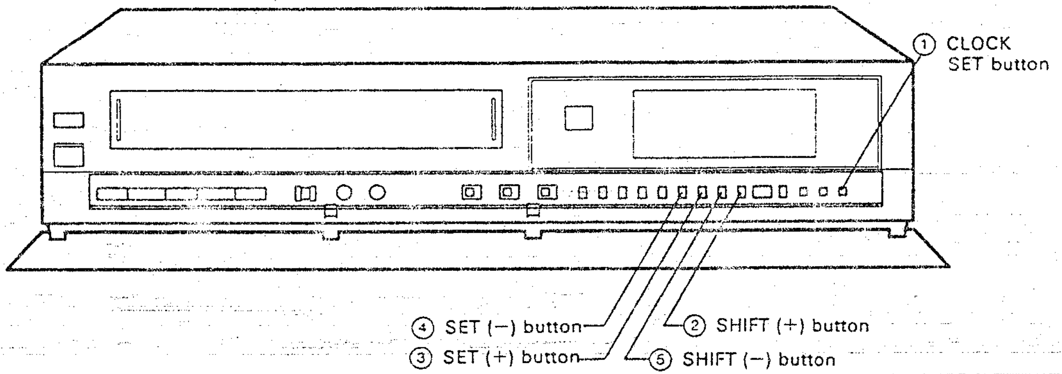


4. Press the PRESET button ④.

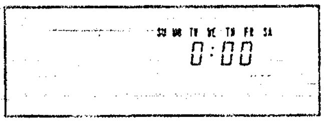
Notes:

1. Skip operation cannot be performed in the channel setting mode.
2. Direct channel selection is also possible even in the channel skip operation mode.
3. To release the channel skip function, perform steps 1 through 4 as for the channel skip setting operation.

SETTING THE VTR CLOCK AND DATE

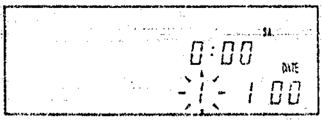


When the power lead is first connected to the AC outlet, or after an interruption of the power supply, the indication SU...SA 0:00 appears, flashing on the display as shown.



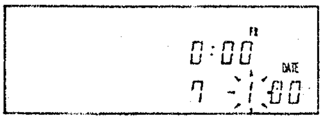
Example: To set for WE 19:25 (Wednesday, 19:25), on 7, February, 1990.

1. Press the CLOCK SET button ① to set the unit to the clock set mode.



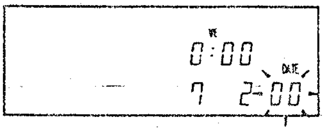
Press the SET (+) button ③ to indicate "7" on the day indication.

2. Press the SHIFT (+) button ② to set the flashing position to the month indication.



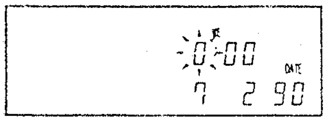
Press the SET (+) button ③ to indicate "2" on the month indication.

3. Press the SHIFT (+) button ② to set the flashing position to the year indication.



Press the SET (+) button ③ to indicate "90" on the year indication.

4. Press the SHIFT (+) button ② to set the flashing position to the hour indication.

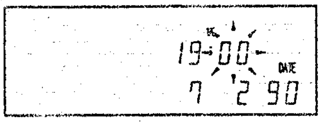


Press the SET (+) button ③ to indicate "19" on the hour indication.

Note:

Once the year, month and day are selected, the day of the week is automatically selected thanks to the built-in calendar.

5. Press the SHIFT (+) button ② to set the flashing position to the minute indication.

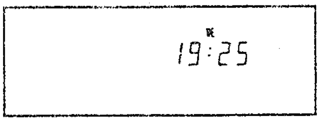


Press the SET (+) button ③ to indicate "25" on the minute indication.

Notes:

1. When the SET (+)/(−) button ③, ④ is pressed once, the digit advances by one. When the button is held down, the digits advance rapidly.
2. If you pass the desired time inadvertently, use the SET (−) button ④ to turn back the hour and minute.
3. If you want to change the indication selected after the next setting step is performed, use the SHIFT (−) button ⑤ to return the indication to the previous setting indication.

6. Press the CLOCK SET button ① to display the current time. When the button is pressed, the clock starts from zero seconds.

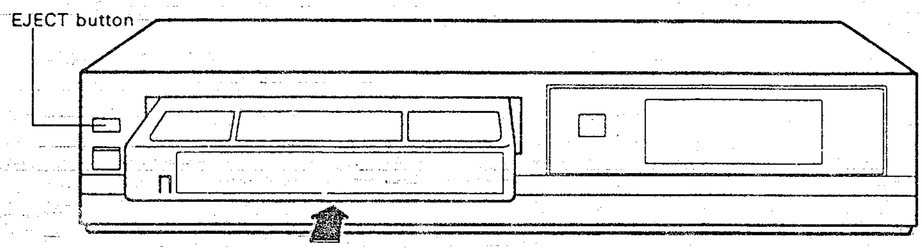


To synchronize the clock with the radio time signal, press the CLOCK SET button ① on the last pip of the hourly time signal.

Notes:

1. After pressing the CLOCK SET button ①, the indication of the year and month as well as the day will go off.
2. If you want to display the year, month and date after setting the VTR clock and date, press the CLOCK SET button ① again.

VIDEO CASSETTE



INSERT A VIDEO CASSETTE

Insert the cassette into the slot of the VTR. The VTR goes on. The cassette indicator lights.

Note:

This VTR is provided with an Auto Power On system. When inserting the cassette, there is no need to press the ON/STANDBY button to turn on the VTR.

REMOVING A VIDEO CASSETTE

Press the EJECT button when the power is on and off. The cassette automatically ejects.

TYPE OF VIDEO CASSETTE

This VTR uses VHS-type cassettes only.

PAL/MESECAM MODE

Type of cassette	Recording/playback time	
	SP	LP
E-30	30 minutes	60 minutes
E-60	60 minutes	120 minutes
E-120	120 minutes	240 minutes
E-180	180 minutes	360 minutes
E-240	240 minutes	480 minutes

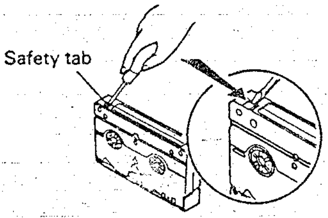
NTSC MODE

Type of cassette	playback time	
	SP	EP
T-30	30 minutes	90 minutes
T-60	60 minutes	180 minutes
T-120	120 minutes	360 minutes
T-160	160 minutes	480 minutes

PRECAUTIONS ON USING VIDEO CASSETTES

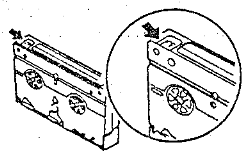
- Video cassettes are equipped with a safety tab to prevent accidental erasure. When the tab is removed, recording cannot be performed. If you wish to record on a cassette whose tab has already been removed, use adhesive tape to cover the hole.

● To prevent accidental erasure



Remove this safety tab with a screwdriver

● To record again



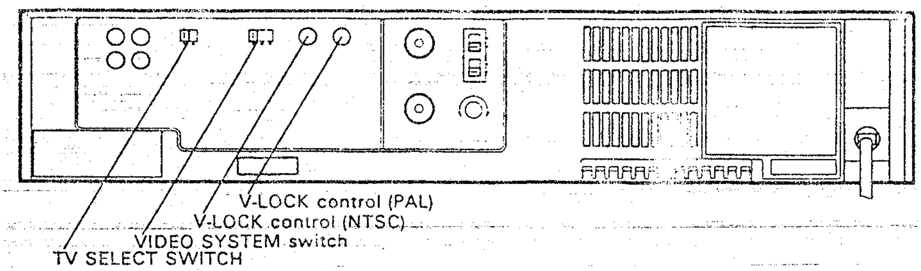
Cover the hole with adhesive tape

- Avoid exposing the cassettes to direct sunlight. Keep them away from heaters.
- Avoid extreme humidity, vibration or shock, strong magnetic fields (near a motor, transformer or magnet) and dusty places.
- Place the cassettes in cassette cases and store vertically.
- Do not insert hand(s) or any foreign object(s) into the cassette compartment.
  Otherwise, injury may result (be especially careful with children) or damage may occur to the VTR.

NOTES ON PLAYBACK

This VTR has been designed so that the tapes recorded in the PAL/MESECAM and NTSC video systems can be played back.

But some points should be observed regarding playback operation. Please read through these pages before starting any operation.



● **TV SELECT switch**

This switch is provided to play back NTSC recorded cassette tapes with an NTSC 4.43 TV set or a PAL system TV set. Set this switch to the "NTSC 4.43" or "PAL 60 (NTSC ON PAL)" position. This VTR can play back NTSC recorded cassette tapes with a PAL video system TV set, but we recommend that you should play back them with an NTSC 4.43 TV set.

● **VIDEO SYSTEM Switch**

This switch is provided to select between the automatic judging method and the manual operation method for playing back a PAL/MESECAM or NTSC recorded tape. With this switch set to the "AUTO" position, the VTR is set to the automatic judging mode and normal playback picture can be obtained. If you do not have a good result when setting the switch to the "AUTO" position, use the "NTSC" or "PAL" position according to the corresponding video system in which the tape has been recorded.

● **V-LOCK control (NTSC)**

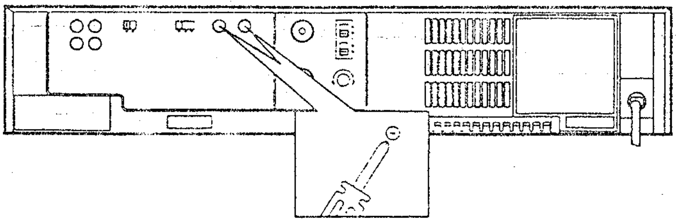
This control is used only when the VTR is in the NTSC playback mode.

The control is provided to lock the vertically jittering picture on the TV screen when the VTR is in the still mode. To adjust this control, use a plus (+) screwdriver.

● **V-LOCK control (PAL)**

This control is used only when the VTR is in the PAL/MESECAM playback mode.

The control is provided to lock the vertically jittering picture on the TV screen when the VTR is in the still mode. To adjust this control, use a plus (+) screwdriver.



NOTES ON PLAYBACK

PAL/MESECAM PLAYBACK

This VTR can playback PAL/MESECAM recorded cassette tapes, in the SP mode or in the LP mode.
Ensure the switch setting positions on the rear panel are set correctly:
VIDEO SYSTEM switch .... "AUTO" or "PAL"

NTSC PLAYBACK

This VTR can play back NTSC recorded cassette tapes, in the SP mode or in the EP mode.
Ensure the switching positions are set correctly:
TV SELECT switch (NTSC only) .... select the setting position according to the TV set (PAL or NTSC 4.43 to be used.
VIDEO SYSTEM switch .... "AUTO" or "NTSC"

Notes when using a PAL TV ~~set for~~ NTSC playback:

1. Use a TV set compatible with PAL video signals of PAL 60. When the TV set, that is not compatible with PAL video signals of PAL 60, is used (when the TV set, that is compatible only with PAL video signals of PAL 50, is used), NTSC playback pictures may roll up and down. If your TV set is equipped with a V-HOLD control, it may be possible to stop the rolling of pictures by adjusting this control.
   About PAL 50 and PAL 60 of PAL video signals:
   - PAL 50: is a normal signal and its PAL video luminance signal is 50 Hz.
   - PAL 60: is a special signal and its PAL video luminance signal is 60Hz.

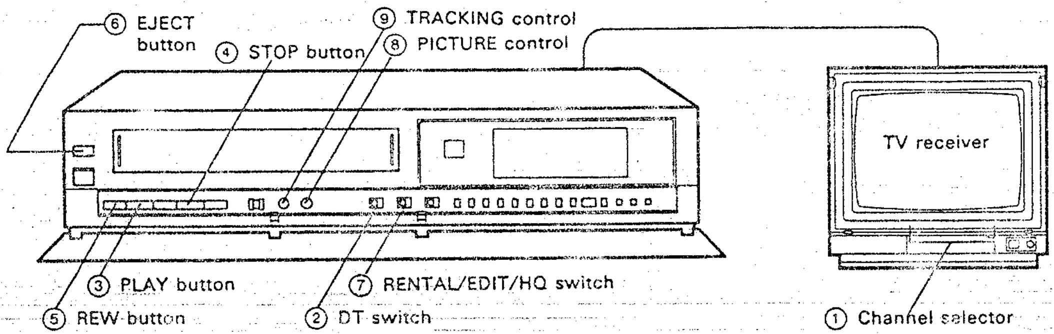
   Some TV sets operate properly only with PAL 50 signals, some TV sets operate properly with both PAL 50 and PAL 60 signals.
2. Depending on the TV set used, the picture may shrink vertically and black bars may appear both at the top and bottom of the screen.
   This is not an indication of malfunction.
3. The special playback operations (double speed playback, still playback etc.) may produce a skewed image and a lot of noise on the picture.

IF YOU UTILIZE A TV SET WITH A BLUE BACK FUNCTION ....

When an NTSC tape that has been prerecorded in SP mode is being picture searched, the background of your TV screen may become blue.

If your TV has a blue back on/off switching function, set the on/off switch to the off position.
This will allow your TV screen to become normal.
(For the blue back switch, refer to the instruction manual provided with a TV set.)
If your TV does not have a blue back on/off switching function when the background of your TV screen becomes blue, set the VTR to the normal play mode.

PLAYBACK


⑥ EJECT button
④ STOP button
⑨ TRACKING control
⑧ PICTURE control
TV receiver
③ PLAY button
⑤ REW button
⑦ RENTAL/EDIT/HQ switch
② DT switch
① Channel selector

TO PLAY A RECORDED TAPE

Before starting playback, be sure to read through the section entitled "NOTES ON PLAYBACK".

1. Set the TV channel selector ① to the VTR output channel.
2. Set the DT Switch ② to the "ON" position.
3. **Insert a pre-recorded cassette without safety tab** into the VTR. The VTR then will be automatically switched to the playback mode. When the tape reaches the end, the tape will be automatically rewound to its start position and ejected. After ejection, the VTR will turn off automatically.

If the pre-recorded cassette has a safety tab:

1. After inserting the cassette, press the PLAY button ③ to start playback.
2. When playback is finished, press the STOP button ④.
3. Rewind the tape by pressing the REW button ⑤.
4. Press the EJECT button ⑥ to take out the cassette.

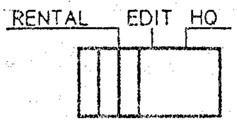
Note:
This VTR selects the correct tape speed mode according to the tape speed in which the tape has been recorded.

Playback and Recording in LP mode (PAL/MESECAM)

When playing back a tape that has been recorded on another VTR, it may happen that the picture color disappears, the picture becomes unstable and that noise occurs. It is therefore recommended that tapes having been recorded with this VTR also are played back with this VTR.

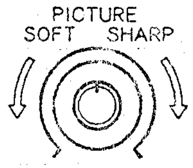
TO PLAY A RENTAL VIDEO TAPE

When playing back a rental video or an overlly copied tape which has a lot of noise in the video picture, you may reduce this noise by placing the RENTAL/EDIT/HQ switch ⑦ to the "RENTAL" position. In normal use, set this switch to the "HQ" position.

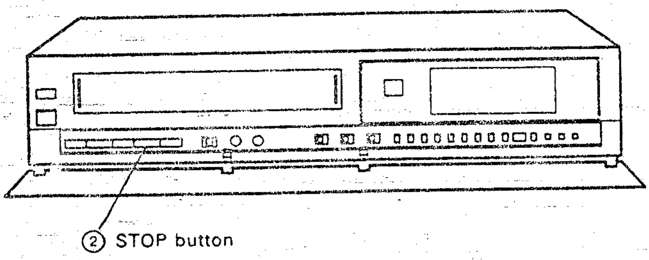

RENTAL
EDIT
HQ

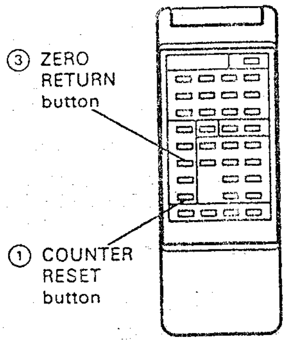
PICTURE SHARPNESS ADJUSTMENT

A PICTURE control ⑧ is installed in this unit. To make the picture sharper, turn the control clockwise; to make the picture softer, turn the control counterclockwise.


PICTURE
SOFT
SHARP

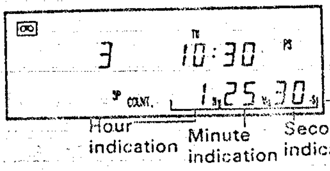
LINEAR TIME COUNTER AND ZERO RETURN





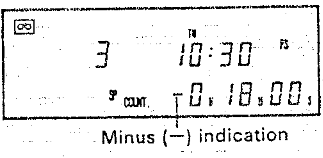
LINEAR TIME COUNTER

This VTR utilizes the linear time counter system. The linear time counter indicates tape run length on the display by the second. When the tape runs one hour twenty-five minutes thirty seconds:



Display example is for a PAL recorded tape.

When the tape is rewound after OHOOMOOS:



Display example is for a PAL recorded tape.

Notes:

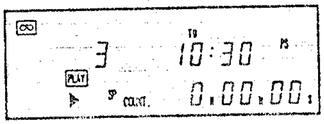
1. When an NTSC recorded cassette is used, the counter indicates the approximate reading value and the indication "H-M-S" is not lit.
2. When stopping playback of an NTSC recorded cassette, the indication "H-M-S" will light. But when starting playback again, this indication will disappear.
3. When the cassette is removed by pressing the EJECT button, the linear counter will return to OHOOMOOS.
4. If there are any sections where the counter stops during rewinding and fast forward, their parts can be assumed to be unrecorded sections.
5. The counter reading does not change at unrecorded sections.

ZERO RETURN

This function is very useful to easily find the desired scenes to be replayed later.

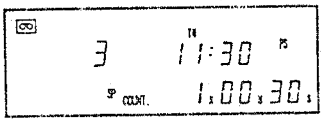
You can set the VTR so that the tape stops around OHOOMOOS of the counter reading during rewinding and fast forward mode.

1. Press the COUNTER RESET button ① on the remote control unit at the point where the desired scenes to be replayed later begins while in the record and play modes.



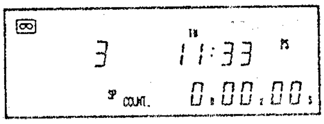
Display example is for a PAL recorded tape.

2. Press the STOP button ② to stop the tape after the playing or recording is completed.



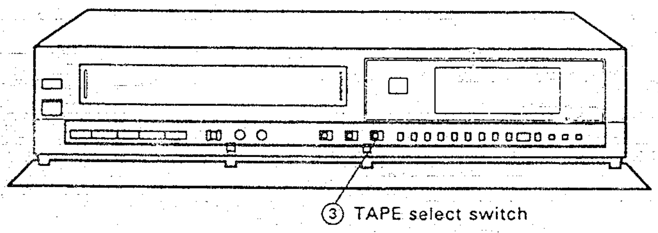
Display example is for a PAL recorded tape.

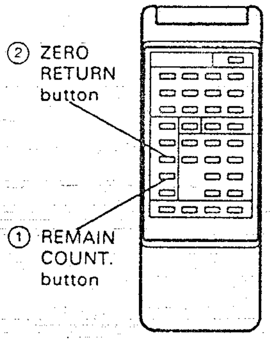
3. Press the ZERO RETURN button ③.
   The tape will be rewound around "OHOOMOOS" of the counter reading. When the ZERO RETURN button is pressed after the tape is rewound before counter reading of "OHOOMOOS", the tape will be fast forwarded around "OHOOMOOS" before stopping.



Display example is for a PAL recorded tape.

TAPE REMAIN DISPLAY



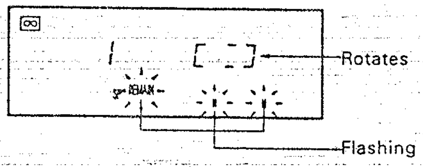


TAPE REMAIN DISPLAY IN THE STOP MODE

Press the REMAIN/COUNT. button ①. The display changes as follows:

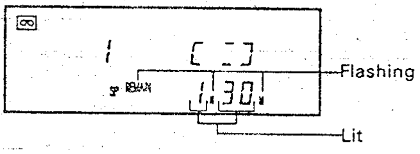
While counting the remain time:

The current time display disappears and changes to the count mode. (Note: The tape remain time is displayed for about 5 seconds.)

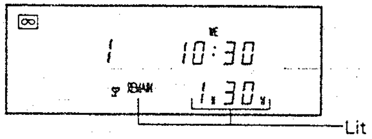


The counting is completed:

The tape remain time will be displayed. The tape will be rewound to the original position.



When the tape is rewound to the original position. The display returns to the current time display.



Note:

Pressing the button again after the calculation is done will display the contents read. This is not a malfunction.

TAPE REMAIN DISPLAY IN THE RECORDING OR PLAY MODE (FOR NTSC TAPES, THIS DISPLAY IS AVAILABLE ONLY IN THE PAL MODE.)

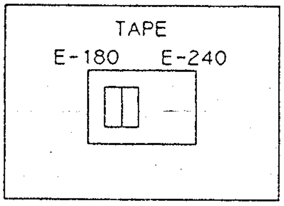
The remaining time on the tape can even be displayed during recording or playback.

1. The tape remain time is automatically calculated during recording or playback, and is displayed by pressing the REMAIN/COUNT. button ①.
2. If the REMAIN/COUNT. button ① is pressed immediately after beginning recording or playback, the tape remain time will be displayed after about half a minute.

Notes:

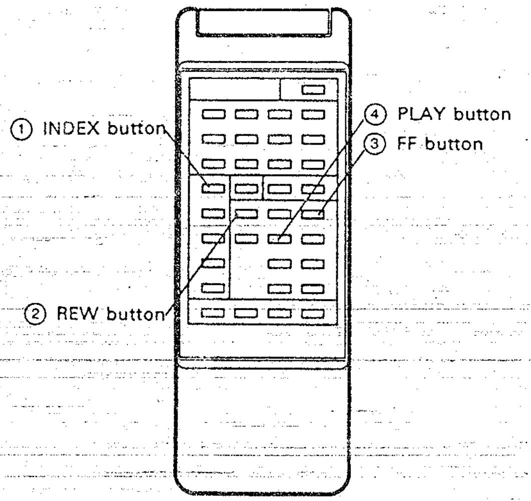
1. The tape remain display will return to the counter display in the following cases: when the unit enters rewind mode or fast forward mode, when the ZERO RETURN button ② is pressed and when the cassette is removed.
2. While in the fast forward or rewind mode, even if the REMAIN/COUNT. button ① is pressed, the counter display will not change to the tape remain display.
3. The tape remain display shows the approximate time remaining on the tape.
4. Set the TAPE select switch ③ to the correct position depending on the tape to be used. Use the E-180 position when using a tape less than E-180 tape length. Use the E-240 position when using an E-240 tape.

TAPE select switch



5. When stopping playing back an NTSC recorded tape, the display shows the remaining time in the PAL/MESECAM mode. But when starting playback again, the remaining time in the NTSC mode is resumed.
6. For the play back time of an NTSC tape, see page 16.

INDEX SEARCH OPERATION

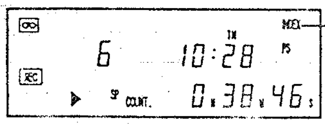


The VTR has a VHS Index Search System function. It can perform easily index search and skip search when using recorded tapes containing index signals. There are two types of INDEX SEARCH systems; INDEX SEARCH and SKIP SEARCH. With INDEX SEARCH, the first 5 seconds of each programme will be played back. With SKIP SEARCH, you can search the programme that you wish to watch.

In the beginning of the tape to be recorded, index signals are automatically registered when the REC button is pressed only in the PAL/MESECAM mode. During recording, you can also use the INDEX button to register index signals at an arbitrary position by following the procedure below.

To register the index signals during recording. (PAL/MESECAM mode)

Press the INDEX button on the remote control panel when you want to register the index signal on the tape.



Kept lit about 3 seconds

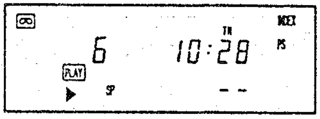
Notes:

1. When the recording is interrupted by a pause stop action and tape replay, index signals are not registered on the part of the tape. In such a case, press the INDEX button on the remote control.
2. The index signal may not be able to be recorded on sections switched between SP and LP.
3. The programme that has been registered at the very beginning of the tape, may not be correctly searched with the index search operation.
4. Press the INDEX button at an interval of more than one minute, during recording. (3 minutes are required in the LP mode.)
5. During recording with the one-touch timer and the timer, the index signal will be registered automatically. However, in the continuous recording, no signal is registered in the connecting part.

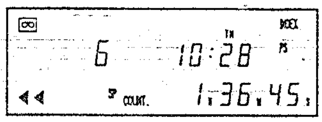
INDEX SEARCH

This function allows you to play back the section recorded with the index signal for five seconds, when the tape is rewound or fast forwarded.

1. Insert a tape that has recorded index signals on it, and set the unit in PLAY or STOP mode. Press the INDEX button ① on the remote control.



2. Press the REW button ② or FF button ③ within 10 seconds. The tape will stop at the section recorded with the index signal and then played back for five seconds.



(The above display is shown in the REW mode.)

3. Press the PLAY button ④, when your desired programme comes on.

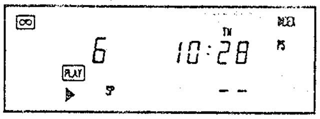
Note:

If you record index signals on the tape pre-recorded on another VTR, that recording may become blurred, and index search may not be performed correctly.

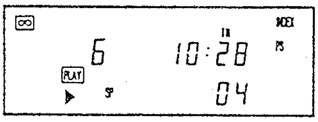
SKIP SEARCH

This function allows you to play back the section specified with the index number.

1. Insert a tape that has recorded index signals on it, and set the unit in PLAY or STOP mode. Press the INDEX button ① on the remote control.



2. Specify the index number with the number keys on the remote control unit within 10 seconds.



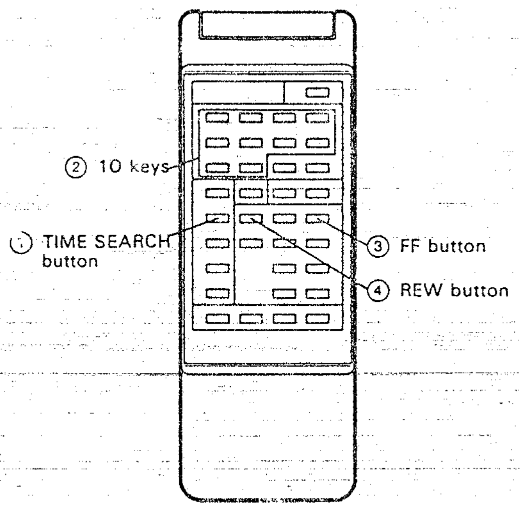
(The above display is shown when the index number is specified to 4.)

3. Press the REW button ② or FF button ③ within 10 seconds. The tape will stop at the section specified with the index number and be played back automatically. The index number display will be changed to the counter index display.

Notes:

1. The index number specification can be up to 99.
2. The number of the index display will decrease by one each time the index signal is skipped.
3. In some cases it may not be possible to skip search a programme that has been registered at the very beginning of the tape.

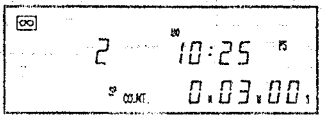
TIME SEARCHING



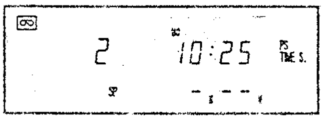
This feature forwards or rewinds the tape by the amount of the specified time from the current tape time indication, in the play or stop mode.

Example:
Tape...PAL recorded tape
VTR operation mode...Stop mode
setting time...to advance by one hour fifteen minutes

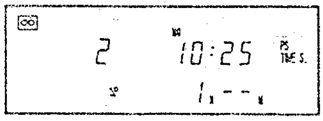
Initial display



1. Press the TIME SEARCH button ① on the remote control unit.
   Perform step 2 within ten seconds.

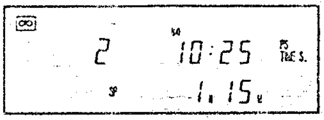


2. Press the "1" key of the 10 keys ② to set the hour time.
   Perform step 3 within ten seconds.

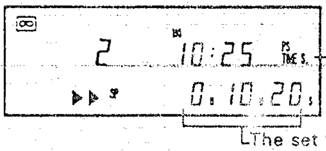


Note:
When setting the time searching time of within one hour, input zero hour with the "0" key.

3. Press the "1" key then "5" key of the 10 keys ② to set the minutes time.
   Perform step 4 within ten seconds.



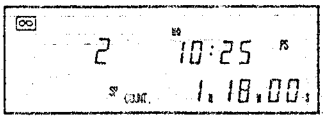
4. Press the FF button ③ or the REW button ④ to forward or rewind the tape. For this example, press the FF button ③. Time searching starts.



Blinks while searching.

The set time counts down when searching begins.

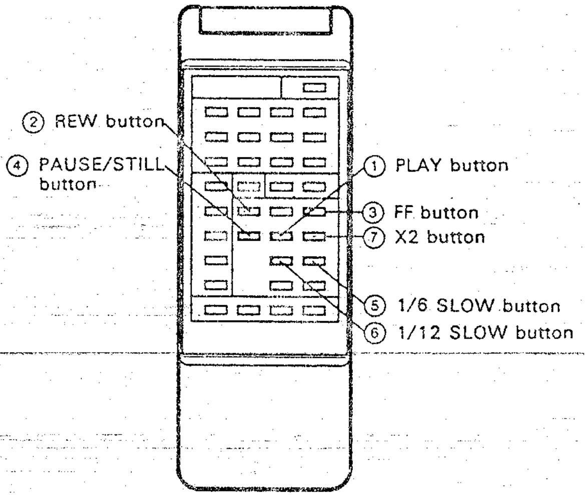
5. Upon completing searching the set time the VTR enteres the stop mode, showing the reading of about 0H00M00S in the display.



Notes:

1. When an NTSC recorded cassette is used, the counter indicates the approximate reading value and the indication "H-M-S" is not lit.
2. In the play mode, time searching is performed in the forward picture search and reverse picture search mode.
   After time searching has finished at the counter reading of about 0H00M00S, the VTR enters the normal play mode automatically.
3. The time display may show a not accurate but approximate time indication.
4. Set the time searching time within about 10 seconds after pressing the TIME SEARCH button.

SPECIALIZED PLAYBACK



PICTURE SEARCH

1. Press the PLAY button ①.
2. When the REW button ② or FF button ③ is pressed, the picture moves quickly (about 7 times the normal speed in PAL/MESECAM mode and 5 times the normal speed in NTSC mode) in reverse or forward direction, and you can search for the desired parts of a programme.

Notes:

1. During picture search operation in the NTSC mode, noise bars may move slightly up and down in the picture.
2. When playing back a PAL/MESECAM recorded tape in the picture search mode, the skewed picture may appear and/or color may disappear. This is not a malfunction.
3. During picture search operation, if the picture rolls vertically on the TV screen, adjust the V-HOLD knob on the TV set.
4. During the picture search operation, the sound will be muted.

STILL PICTURE

1. Press the PLAY button ①.
2. To stop the tape momentarily or to watch a still picture during playback, press the PAUSE/STILL button ④.
3. Press the PAUSE/STILL button ④ again to release the still picture and return to normal playback.

Notes:

1. In the still mode, the skewed picture may appear.
2. The still mode will cease automatically after a lapse of approximately 5 minutes. The VTR will return to PLAY from STILL.
3. If noise appears in the center of the still picture, after selecting SLOW mode, try moving the noise out of the way by pressing the SLOW TRACKING buttons (▲/▼) on the remote control unit.
4. Even if you adjust the picture distortion on the TV with the V-LOCK control, vertical picture distortion still might occur depending on the TV.
5. When watching a tape that has been recorded on another VTR in STILL mode, noise may remain on the screen even if the SLOW TRACKING button is depressed.

FRAME ADVANCE

1. Press the PLAY button ① (in play mode).
2. Press the PAUSE/STILL button ④ (in still mode).
3. Press the PLAY button ①. One press on the PLAY button ① will advance one frame on the tape.
4. Release the PLAY button ① and then press the PAUSE/STILL button ④. The VTR returns to normal playback.

SLOW PLAY

Pressing the SLOW button allows you to play back the picture at 1/6 or 1/12 the speed of normal playback.

1. Press the PLAY button ①.
2. Press the 1/12 SLOW button ⑥ or 1/6 SLOW button ⑤.
3. Press the PLAY button ① again to resume normal playback.

Notes:

1. Use the SLOW TRACKING buttons if noise appears on the TV screen.
2. Even if you adjust the picture distortion on the TV with the V-LOCK control, vertical picture distortion still might occur depending on the TV.
3. When watching a tape that has recorded on another VTR in SLOW PLAY mode, noise may remain on the screen even if the SLOW TRACKING button is depressed. In the slow mode, the skewed picture may appear.

DOUBLE SPEED PLAYBACK

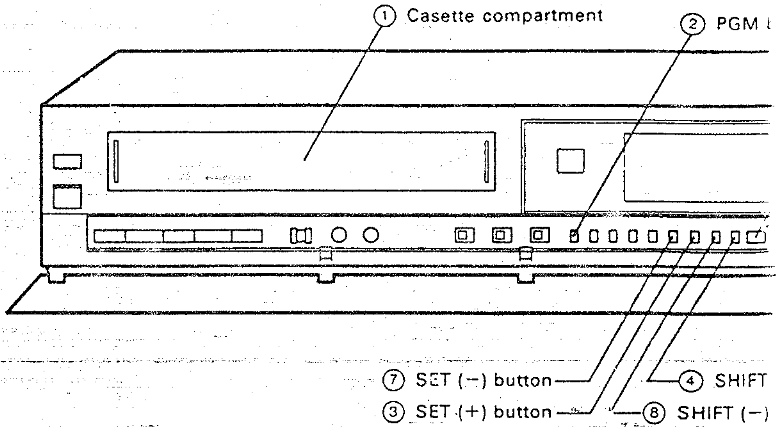
Pressing the X2 button allows you to play back the picture at a speed double the normal playback.

1. Press the X2 button ⑦ in the play, stop or slow mode.
2. Press the PLAY button ① again to return to the normal play mode.

Note:

During the double speed playback, sound is heard.

TIMER RECORDING (NOT IN NTSC



The timer in this VTR can hold eight preset programmes over a 4 week (28 days) period. These programmes may be for one time recordings, recording at the same time every day or recording on the same day of the week. The clock has a 24 hour format. This VTR is capable of 28-day timer setting, and is designed to start timer recording when the TIMER button is pressed. This VTR lets you select the desired day by one of six settings.

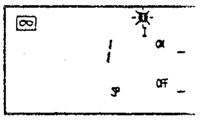
OPERATION

To make timer programmes while checking with the fluorescent display

1. Confirm the current time. If the current time is not correct, reset the current time.
2. Insert a cassette into the cassette compartment ①. (Check if the cassette safety tab has not been removed.)
3. Set the VTR to enter the timer programme mode with the PGM button ②.
4. Specify the programme number with the SET (+) button ③.
5. Press the SHIFT (+) button ④. The flashing position will move to the channel indication. Press the SET (+) button ③ to flash the desired channel indication.
6. Press the SHIFT (+) button ④. The flashing position will move to the week indication. Press the SET (+) button ③ to flash the desired week indication.
7. Press the SHIFT (+) button ④. The flashing position will move to the day indication. Press the SET (+) button ③ to flash the desired day indication.
8. Press the SHIFT (+) button ④. The flashing position will move to the on time hour indication. Press the SET (+) button ③ to select the desired on time hour.
9. Press the SHIFT (+) button ④. The flashing position will move to the on time minutes indication. Press the SET (+) button ③ to select the desired on time minutes.
10. Press the SHIFT (The flashing posi indication. Press desired off time
11. Press the SHIFT (The flashing po minutes indicatio select the desire
12. Select the tape sp select button ⑤.
13. To continue to p SHIFT (+) button
14. Press the TIMER

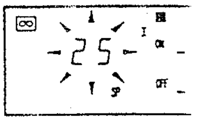
Example: To preset c 13:30 to 14:20 of t mode. (Today is Frida

1. Press the PGM b gramme mode po



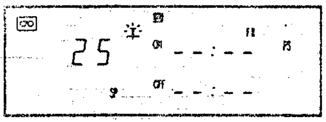
2. Press the SET (+)

3. Press the SHIFT (+ will be flashing. Se (+) button ③.



TIMER RECORDING (NOT IN NTSC MODE)

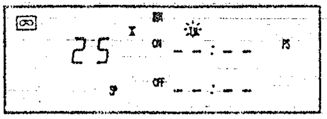
4. Press the SHIFT (+) button ④. The week indication will be flashing. Set the week to the "II" position with the SET (+) button ③.



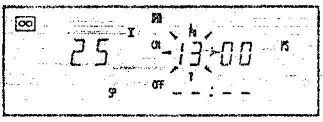
Notes:

1. If you pass the desired time or setting position inadvertently, use the SET (−) button ⑦ to display the correct indication.
2. If you want to return to the previous setting step, use the SHIFT (−) button ⑧.

5. Press the SHIFT (+) button ④. The day indication will be flashing. Set the day to the "TU" position with the SET (+) button ③.



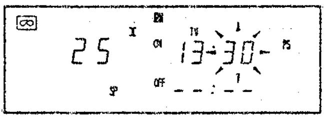
6. Press the SHIFT (+) button ④. The on time hour indication will be flashing. Set the on time hour to "13" with the SET (+) button ③.



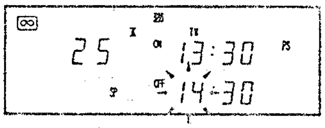
Note:

When the SET (+) button ③ or SET (−) button ⑦ is pressed once, the current time will be displayed on the on time indication.

7. Press the SHIFT (+) button ④. The on time minutes indication will be flashing. Set the on time minutes to "30" with the SET (+) button ③.

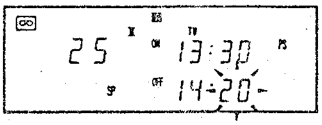


8. Press the SHIFT (+) button ④. The off time hour indication will be flashing. Set the off time hour to "14" with the SET (+) button ③.

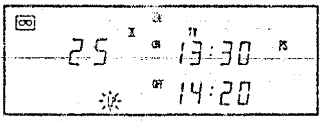


When the SET (+) button ③ or SET (−) button ⑦ is pressed once, the on time indication will be displayed on the off time indication.

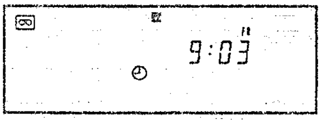
9. Press the SHIFT (+) button ④. The off time minutes indication will be flashing. Set the off time minutes to "20" with the SET (+) button ③.



10. Press the SHIFT (+) ④ button. Then select the tape speed (SP or LP) with the tape speed select button ⑤. Set it to the LP position.



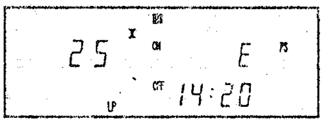
11. Press the TIMER button ⑥.



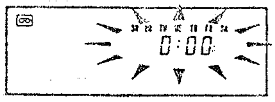
(The VTR clock works during timer setting.)

Notes:

1. When no cassette is loaded, timer recording is not possible.
   In this case, the "E" indicator is displayed while the TIMER button ⑥ is pressed.

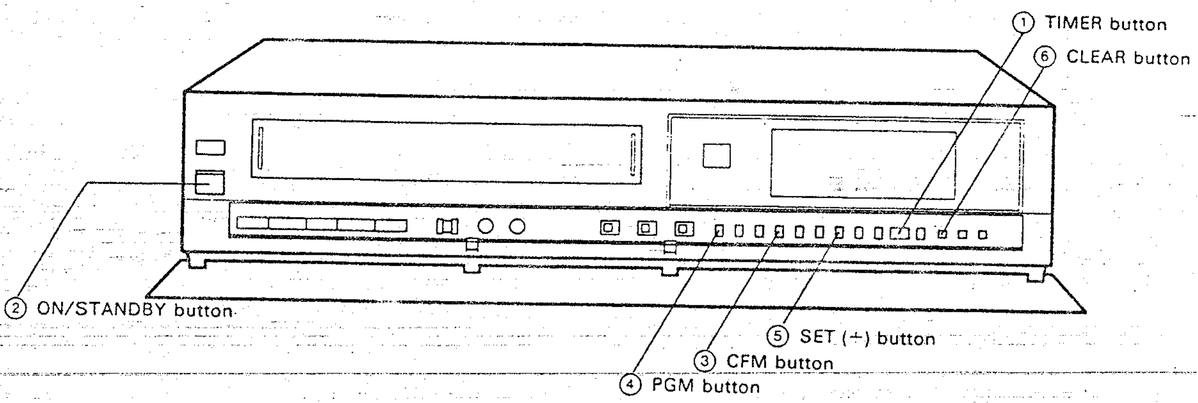


2. If the cassette tab has been removed, timer recording is also not possible. At this time, the cassette is ejected automatically.
3. During timer recording, the preset contents (programme number, channel, day of the week or timer on/off time) cannot be changed.
4. Programme settings remain in effect until they are executed.
5. When the clock is flashing after a power interruption as shown below, the preset programmes become ineffective. Reset the VTR clock to the current time with the CLOCK SET button ⑨ and do the programme setting from the beginning.



6. To proceed to another programme setting after step 9 press the SHIFT (+/−) buttons ④ or ⑧ to select the programme number position and set the programme number with the SET (+) button ③.
7. Timer setting is possible even in standby mode.

ADDITIONAL INFORMATION FOR TIMER RECORDING


① TIMER button
⑥ CLEAR button
② ON/STANDBY button
⑤ SET (+) button
③ CFM button
④ PGM button

TO USE THE VTR AFTER SETTING THE PROGRAMMABLE TIMER

1. Press the TIMER button ① to release the timer mode.
2. Press the ON/STANDBY button ② to turn on the VTR.
3. After use, be sure to press the CFM button ③ to verify the contents of the stored programmes.
4. To enter the timer mode again, press the TIMER button ①.

TO CANCEL THE TIMER PROGRAMME

1. Press the PGM button ④ to enter the timer programme operation mode.
2. Specify the programme where the programme data to be cancelled are placed, with the SET (+) button ⑤.
3. Press the CLEAR button ⑥. The timer off time and channel are also erased.

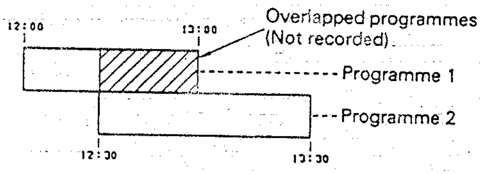
TO CHECK THE TIMER PROGRAMME

The following method is available to check the data preset in the timer programme.

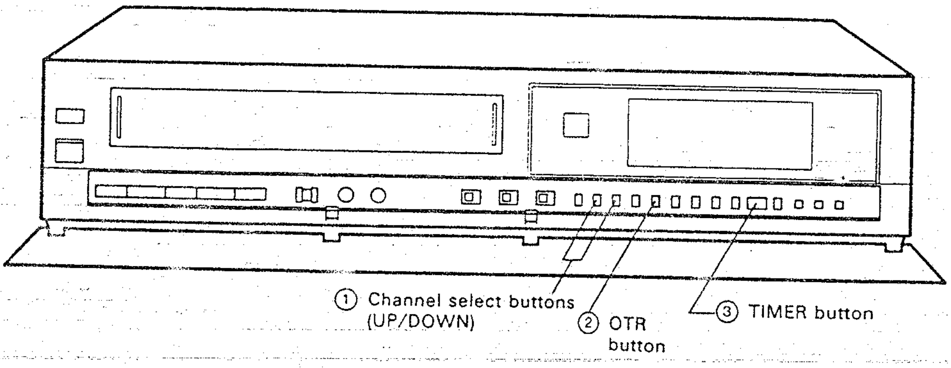
1. Press the CFM button ③.
   The fluorescent display will show the contents of programmes 1 through 8 (start time and end time) that were previously stored continuously at an interval of about five seconds and return to the original display.

PROGRAMME OVERLAPPING

Be careful not to overlap the preset times.
If you happen to overlap the preset programmes, start time has priority in execution, and the overlapped programme will not be recorded. See figure below.


12:00
13:00
Overlapped programmes
(Not recorded)
Programme 1
Programme 2
12:30
13:30

ONE TOUCH TIMER RECORDING (NOT IN NTSC MODE)

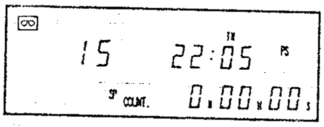


This VTR unit features a one touch recording (OTR) function. This function allows you to record at 30 minute periods, for up to 4 hours.
After the recording is completed, the power goes off automatically.
Also, when setting the timer, the off time can be set at 30 minute periods. The One Touch Recording (OTR) mode takes priority over other VTR operation modes. For example, when the OTR mode is activated while the VTR is in the timer mode, the VTR will automatically return to the timer mode after the OTR mode is completed.

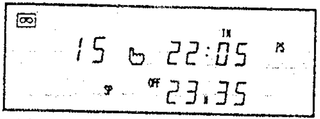
OTR OPERATION

Example: To record channel 15 starting from now for 1-1/2 hours at a current time on Thursday, 22:05

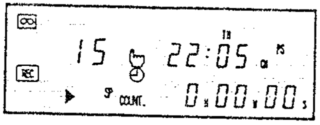
1. Select channel 15 by pressing channel select buttons (up/down) ①.



2. Press the OTR button ② to set the recording time.
   When the OTR button ② is pressed once: 22:35 (30 minutes)
   When the OTR button ② is pressed twice: 23:05 (1 hour)
   When the OTR button ② is pressed three times: 23:35 (1 hour and 30 minutes)



3. Press the TIMER button ③ within 9 seconds.



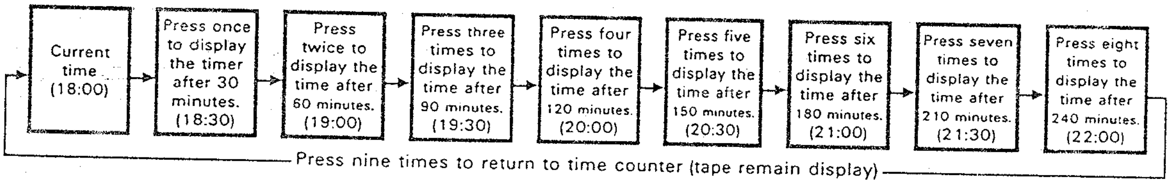
Notes:

1. Thirty minutes are added every time the OTR button ② is pressed, for up to 4 hours (eight times). (The one touch timer can only be set in 30-minute units.)
2. One touch timer operation is possible only when power is on and the VTR is in the clock mode.
3. The one touch timer function has priority over any other operation function (playback, recording, timer, etc.).

Error indication

When the TIMER button ③ is pressed without setting timer on/off time, or without a cassette in the compartment, the "E" indicator lights (while the TIMER button ③ is pressed).

- **Each time you press the OTR button ②, the indication will change as follows.**



Current time (18:00)
Press once to display the timer after 30 minutes. (18:30)
Press twice to display the time after 60 minutes. (19:00)
Press three times to display the time after 90 minutes. (19:30)
Press four times to display the time after 120 minutes. (20:00)
Press five times to display the time after 150 minutes. (20:30)
Press six times to display the time after 180 minutes. (21:00)
Press seven times to display the time after 210 minutes. (21:30)
Press eight times to display the time after 240 minutes. (22:00)
Press nine times to return to time counter (tape remain display)

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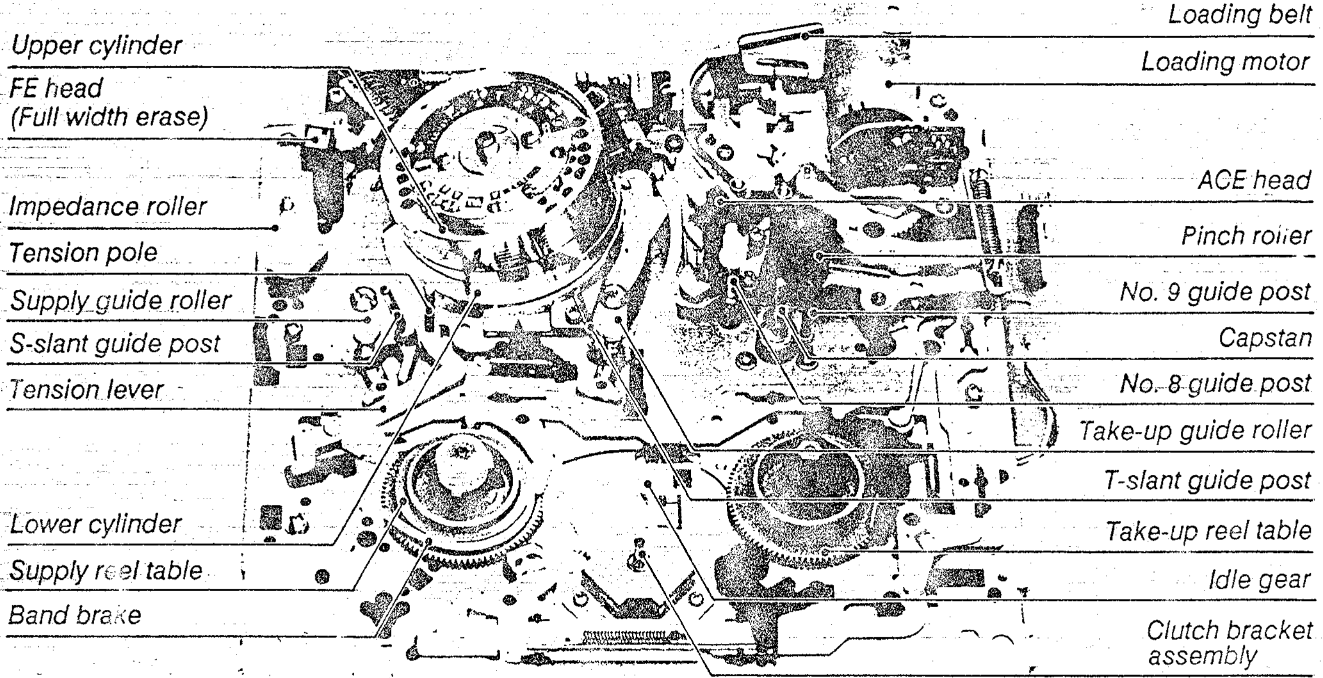
SECTION 2
ADJUSTMENT PROCEDURES

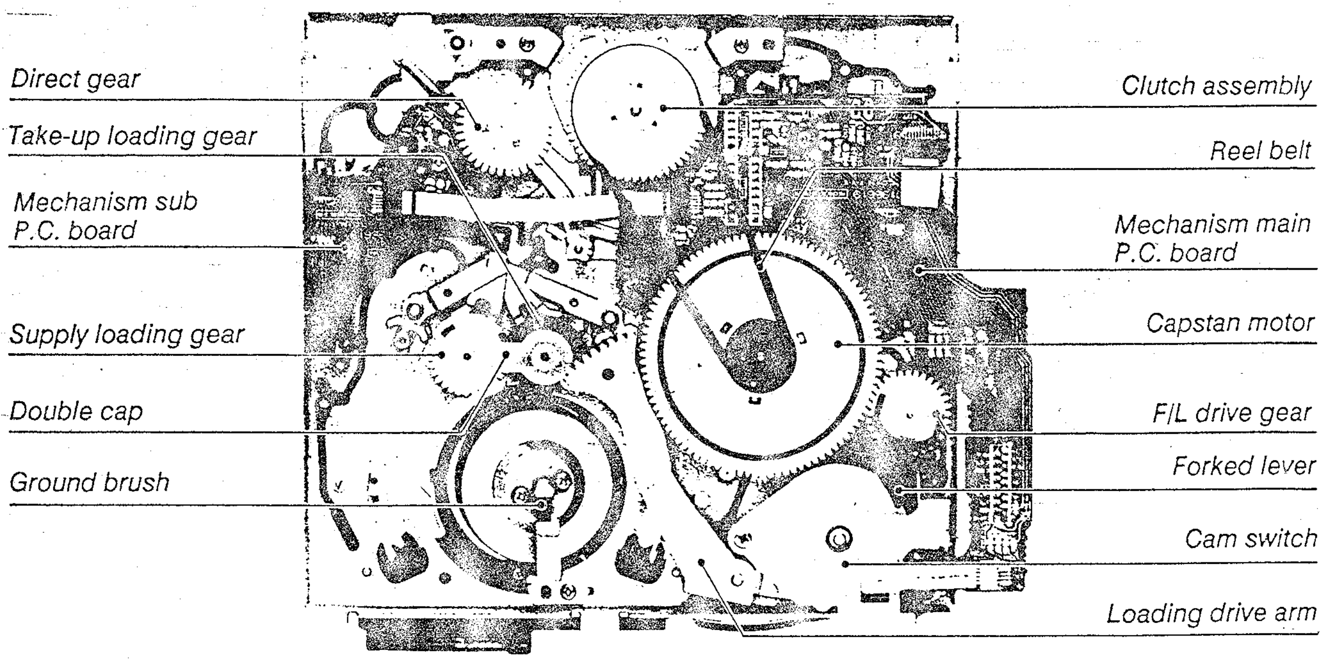
1. MECHANICAL ADJUSTMENT

1-1. Mechanical Parts Location

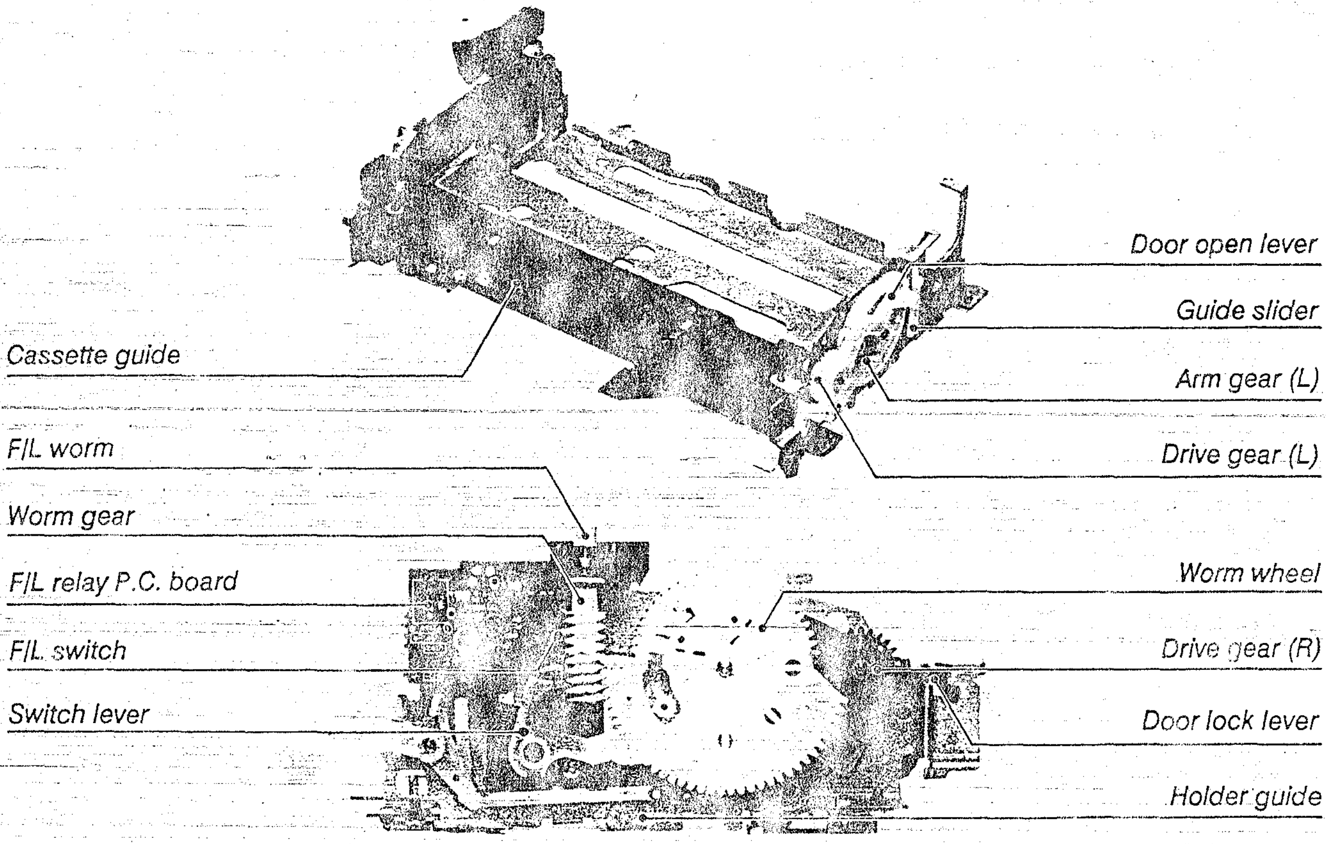
1-1-1. Top View


Upper cylinder
FE head (Full width erase)
Impedance roller
Tension pole
Supply guide roller
S-slant guide post
Tension lever
Lower cylinder
Supply reel table
Band brake
Loading belt
Loading motor
ACE head
Pinch roller
No. 9 guide post
Capstan
No. 8 guide post
Take-up guide roller
T-slant guide post
Take-up reel table
Idle gear
Clutch bracket assembly

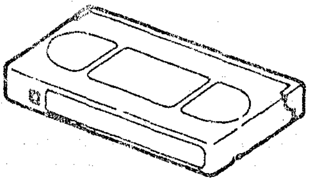
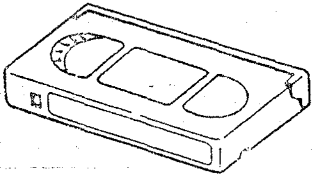
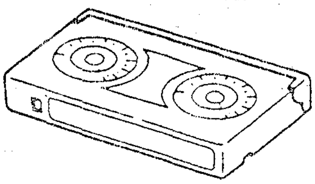
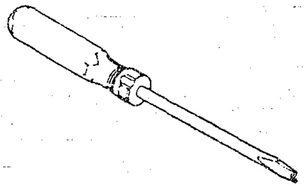
1-1-2. Bottom View


Direct gear
Take-up loading gear
Mechanism sub P.C. board
Supply loading gear
Double cap
Ground brush
Clutch assembly
Reel belt
Mechanism main P.C. board
Capstan motor
F/L drive gear
Forked lever
Cam switch
Loading drive arm

1-1-3. Front Loading Mechanism


Door open lever
Guide slider
Cassette guide
Arm gear (L)
F/L worm
Drive gear (L)
Worm gear
F/L relay P.C. board
Worm wheel
F/L switch
Drive gear (R)
Switch lever
Door lock lever
Holder guide

1-2. Servicing Jig List

Alignment tape  ST-C1: 70909227	**Back tension cassette gauge**  70909103	**Torque cassette gauge (KT-300NR)**  70909199
Taper nut driver  70909228		

The alignment tape MH-2 (70909094) can be used instead of alignment tape ST-C1.

1-3. Main Parts Servicing Time

- Part replacement time differs from serving life time of each part.
- Following table is prepared based on a standard condition (room temperature, room humidity). The replacement time will be varied depending upon operation environment, using methods, operation duty, etc.
- Particularly, life of the upper cylinder depends upon operation conditions.

	Part Name	Servicing Time (Operating Hours)										Note
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
Tape Transport System	Tension pole	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	• When cleaning, use a swab or a piece of gauze soaked in alcohol. • After the cleaning, cleaned parts are dried completely, and then load a video cassette. • When lubricating, always use the specified oil. • When lubricating, apply one or two drops of oil after the cleaning with alcohol.
	S-slant guide post											
	S-guide roller											
	Impedance roller											
	No. 8 guide post											
	Capstan											
	No. 9 guide post											
	Guide roller											
	T-slant guide post											
	Upper cylinder	Δ	O	Δ	O	Δ	O	Δ	O	Δ	O	
	FE head	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	O	
	ACE head	Δ	Δ	Δ	Δ	Δ	O	Δ	Δ	Δ	Δ	
	Pinch roller	Δ	Δ	Δ	Δ	Δ	O	Δ	Δ	Δ	Δ	
Tape Drive System	Capstan motor						O				O	
	Reel belt		Δ		O		Δ		O		Δ	
	Loading motor										O	
	Loading belt		Δ		O		Δ		O		Δ	
	Supply reel table				▲				▲		O	
	Take up reel table				▲				▲		O	
	Idle gear assembly		O		O		O		O		O	
Others	Band brake assembly		O		O		O		O		O	• Check the back tension.

Δ : Cleaning ▲ : Lubrication O : Check and replace if necessary

1-4. Main Parts Replacement

1-4-1. Front Loading Assembly Replacement

(1) Front loading assembly replacement

< Replacement >

1. Remove the top cover, front panel, and the bottom plate.
2. Remove the FL belt from rear bottom of the unit.
3. Disconnect the connector (A) from the F/L-R P.C. board.
4. Remove two screws (A).
5. Move the front loading assembly in direction shown by the arrow and remove it from the mechanism deck.
6. When remounting, use the above steps in reverse order.

Note:

When reinstalling the FL belt, take care the belt is not twisted.

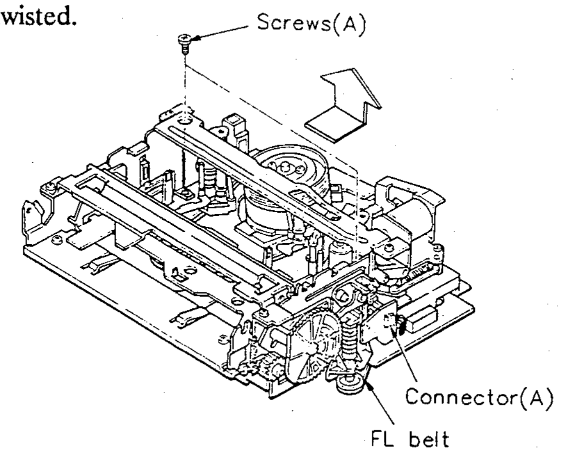


Fig. 4-1-1 Front loading assembly replacement

(2) F/L switch (SI22) and photo-transistor (QI21) replacement

1. Remove the screw (B) and the F/L-R P.C. board.
2. To remove the F/L switch and photo-transistor, unsolder the leads.
3. Replace them with new ones.

Note:

When reinstalling the F/L-R P.C. board, take care the F/L switch is not damaged.

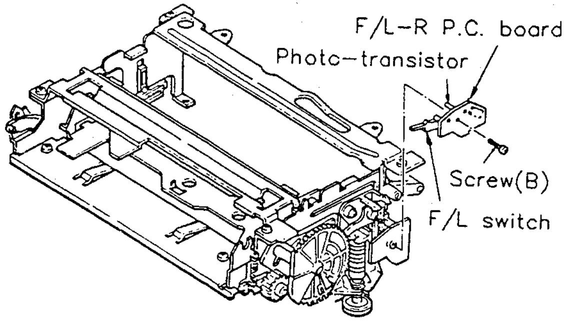


Fig. 4-1-2 F/L switch and photo transistor replacement

(3) Guide slider (K317) replacement

1. Turn the FL worm gear with your hand until the cassette holder is set to the cassette in condition.
2. Move the holder guide L outward and remove the guide slider from the cassette holder. Then, remove the guide slider from the holder guide L.
3. When remounting, use above steps in reverse order.
4. Turn the FL worm gear with your hand and set the cassette holder to the cassette out condition.

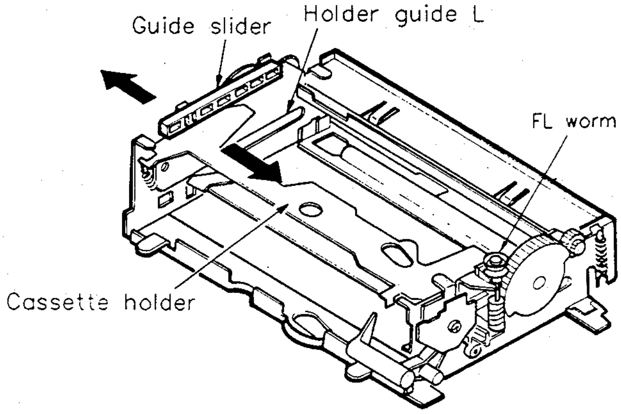


Fig. 4-1-3 Guide slider replacement

(4) Replacement of other parts

1. Do not replace the components not authorized. (Refer to the Parts List.) If replaced, accuracy of the front loading assembly will decrease and smooth operation may be not obtained.
2. When replacing the arm gear and the drive gear, take care on the following points:
   a: Position the arm gear and the drive gear so that their alignment marks match with the arm gear facing almost upward as shown in the illustration, and then mount them. This is true for both the left and right sides.
   b: If the alignment marks are not matched, the front loading may not operate smoothly.

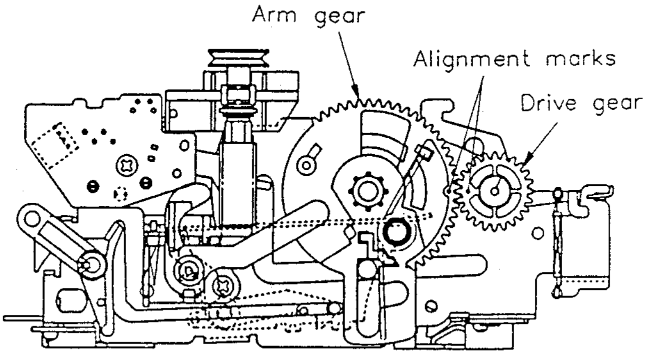


Fig. 4-1-4

1-4-2. Cylinder

(1) Upper cylinder assembly

< Inspection >

1. Check if video heads are damaged or worn out.
2. Check video heads for clogging.
   (Replace the upper cylinder assembly if the clogging is not remedied after cleaning.)

< Replacement >

1. Unsolder the relay terminals on the head relay P.C. board. The solder will be removed easily using a desoldering wire (Fig. 4-2-1, 4-2-2).
2. Remove two screws and remove the upper cylinder assembly.
3. Clean the new upper cylinder assembly and the surface of the flange before mounting, using a cleaning kit.
4. Align phases of the white part of Head relay P.C. board and Rotary transformer (A) P.C. board and then mount the upper cylinder.
   (Tightening torque; 3 – 4kg-cm.)
5. Perform the tape transport adjustment.

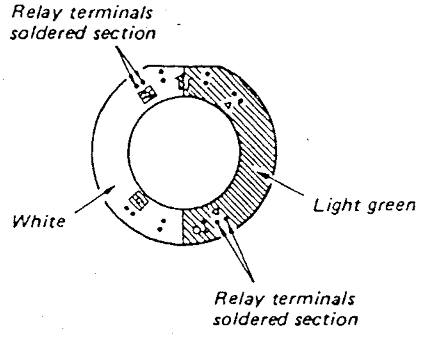

Relay terminals soldered section
White
Light green
Relay terminals soldered section

Fig. 4-2-1 Head relay P.C. board

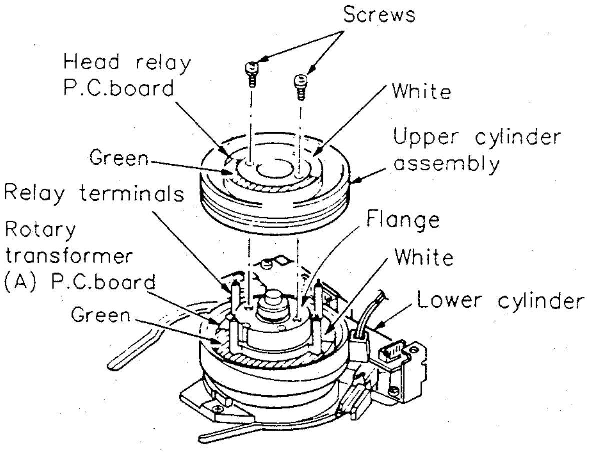

Screws
Head relay P.C.board
White
Upper cylinder assembly
Green
Relay terminals
Flange
Rotary transformer (A) P.C.board
White
Green
Lower cylinder

Fig. 4-2-2 Upper cylinder replacement

(2) Cylinder motor

< Inspection >

1. Apply power to the cylinder motor separately.
2. If the motor does not rotate, replace the cylinder motor (rotor and stator).

< Rotor replacement >

1. Remove the ground cap.
2. Remove two rotor screws and replace the rotor.
   (Tightening torque; 3 – 4kg-cm.)

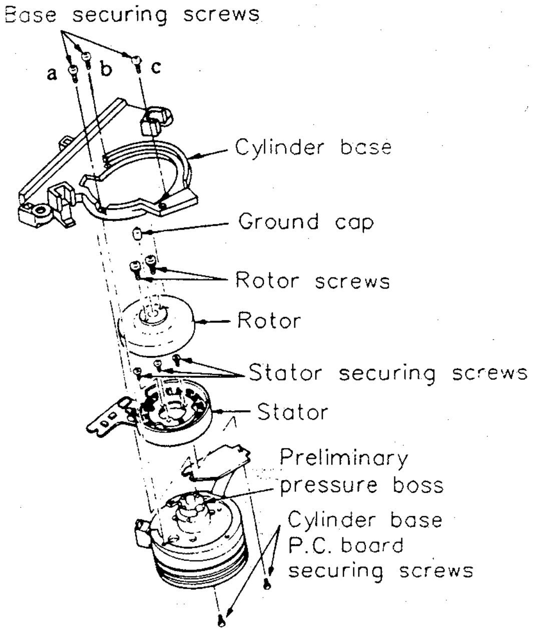

Base securing screws
a
b
c
Cylinder base
Ground cap
Rotor screws
Rotor
Stator securing screws
Stator
Preliminary pressure boss
Cylinder base P.C. board securing screws

Fig. 4-2-3 Cylinder motor replacement

Note:

When mounting a new rotor, position the rotor so that its phase matching holes match those of the preliminary pressure boss. (Fig. 4-2-4)

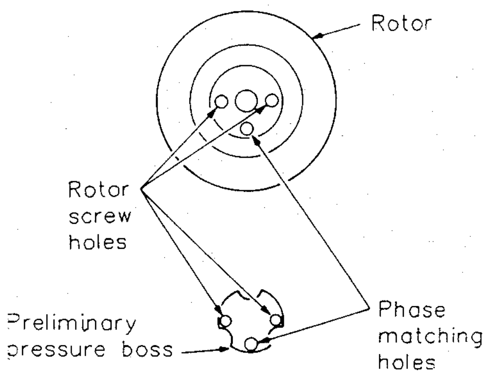

Rotor
Rotor screw holes
Preliminary pressure boss
Phase matching holes

Fig. 4-2-4 Phase matching between rotor and preliminary pressure boss

< Stator replacement >

1. Remove the cylinder assembly. (Refer to the cylinder replacement procedures.)
2. Remove the cylinder base P.C. board securing screw (Fig. 4-2-5).

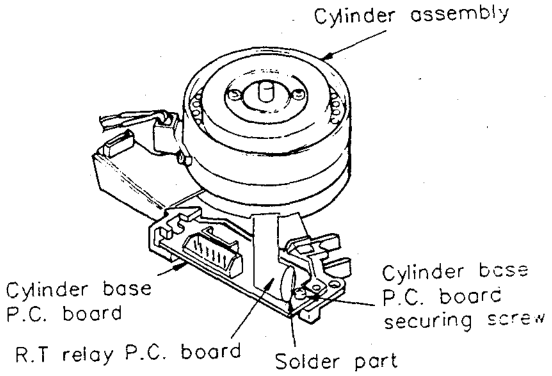

Cylinder assembly
Cylinder base P.C. board
Cylinder base P.C. board securing screw
R.T relay P.C. board
Solder part

Fig. 4-2-5 Relay P.C. board and cylinder base P.C. board

Note:
In this case, take care not to damage patterns of the R.T relay P.C. board.
Also handle the cylinder base P.C. board carefully so that the cylinder is not damaged by the cylinder base P.C. board.

3. Remove three base securing screws and remove the cylinder base. (Fig. 4-2-3)
4. Remove the ground cap.
5. Remove the rotor screws and the rotor. (Fig. 4-2-3)
6. Remove the stator securing screws.
7. Pull out the stator and replace it. (Tightening torque 1.5 – 2.5 kg-cm)
8. Replace the rotor. (Tightening torque 3 – 4 kg-cm) (Fig. 4-2-3)
9. When mounting the cylinder assembly, perform the previous steps in reverse order.

Note:
Sequence of tightening base securing screws: tighten screw a first, b and c in any order.
(Tightening torque is 3 – 4 kg-cm.)
(Fig. 4-2-3)

10. Perform the tape transport adjustment.

(3) Cylinder assembly

< Inspection >

1. Check to see that rotating surface of the lower cylinder has no damage such as scratches, cracks, etc.
2. Check to see smooth rotation of the upper cylinder. If abnormality is found, replace the cylinder(s).

< Replacement >

1. Remove two preamplifier securing screws and remove the preamplifier.
2. Remove three screws (A).
3. Remove the cylinder motor connector.
4. Remove the cylinder assembly.

Note:
When removing the cylinder assembly, move the impedance roller in direction shown by the arrow.

4. Align position of a new cylinder to the cylinder base, taking care not to touch the video heads directly and not to damage the cylinder surface.
When mounting the cylinder assembly, perform the previous steps in reverse order.
Do not forget the preamplifier mounting bracket is to be tightened with the cylinder assembly.
5. Perform the tape transport adjustment.

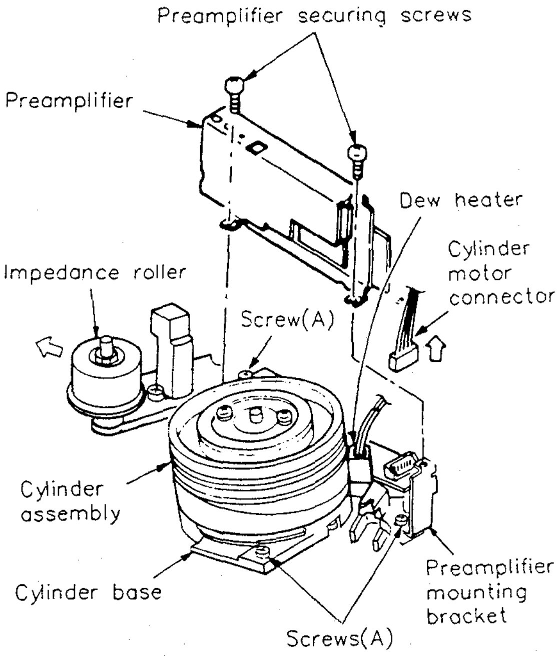

Preamplifier securing screws
Preamplifier
Dew heater
Cylinder motor connector
Impedance roller
Screw(A)
Cylinder assembly
Cylinder base
Preamplifier mounting bracket
Screws(A)

Fig. 4-2-6 Cylinder assembly replacement

1-4-3. Transport System Parts Replacement

(1) ACE head assembly replacement

1. Disconnect the connector from the ACE P.C. board.
2. Remove the taper nut.
3. Remove the pinch lock spring and pinch connector so that they do not give trouble when removing the pinch roller from the ACE head.
4. Turn the ACE height adjusting nut counterclockwise and remove the nut in order to remove ACE base assembly. (Fig. 4-3-1)

Note:

Note positions of the ACE base and the taper nut.

4. Remove the E-ring and the ACE azimuth adjusting screw in order to remove the ACE head assembly.
5. Remove the ACE P.C. board from the ACE head assembly.
6. Replace the ACE head assembly, according to the reverse procedures.
7. Mount the taper nut, pinch lock spring and pinch connector.
8. Rotate the ACE height adjusting nut until the ACE base and the upper position of the taper nut have the same position as they were removed.
9 After mounting, perform the tape transport adjustment, starting from the first step.

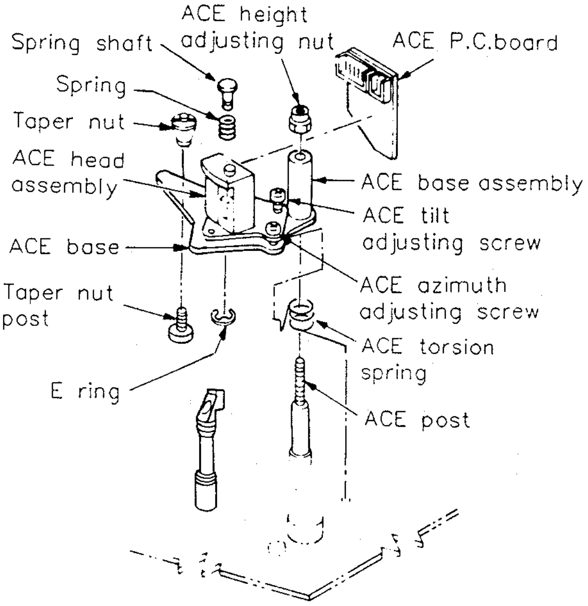

ACE height adjusting nut
Spring shaft
ACE P.C.board
Spring
Taper nut
ACE head assembly
ACE base assembly
ACE tilt adjusting screw
ACE base
ACE azimuth adjusting screw
Taper nut post
ACE torsion spring
E ring
ACE post

Fig. 4-3-1 Replacement of ACE head assembly

Note:

- Since direct mounting of the ACE torsion spring is difficult, first insert the tip of the spring into the hole on the main base and then hook the opposite tip of the spring to the ACE base which has been inserted into the ACE post.
- When replacing the ACE head assembly, always use an ACE head having the same part number. Do not use any other ACE head assembly.

(2) No. 8 guide sleeve replacement

1. Remove No. 8 cap and No. 8 guide sleeve in this sequence as shown in Fig. 4-3-2. When reassembling, perform the previous steps in reverse order.
2. To mount the No. 8 guide sleeve, insert the No. 8 cap onto the No. 8 post and push the cap downward while turning the cap left and right.

Note:

- No. 8 guide sleeve functions as the reference for tape transport, so the replacement should be made carefully.
- When mounting the No. 8 guide cap, mount the cap with its slant surface facing to cassette side.
- The guide sleeve has a directional characteristic, so take care when inserting it. Do not insert the sleeve upside-down. The lower flange thickness is higher than the upper flange thickness by about 1.6mm.

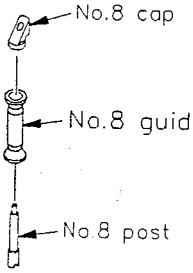

No.8 cap
No.8 guide sleep
No.8 post

Fig. 4-3-2 No. 8 guide replacement

(3) FE head replacement

1. Disconnect the 2P connector of the FE head.
2. Remove the FE head mounting screw and the FE head can be removed. (Fig. 4-3-3)
3. Replace the new FE head and tighten the FE head mounting screw.
4. Connect the 2P connector.
5. Confirm whether the associated adjustments is not upset, starting check from the linearity adjustment, item 4) of the tape transport adjustment. (Refer to item 1-5-4 (3).)

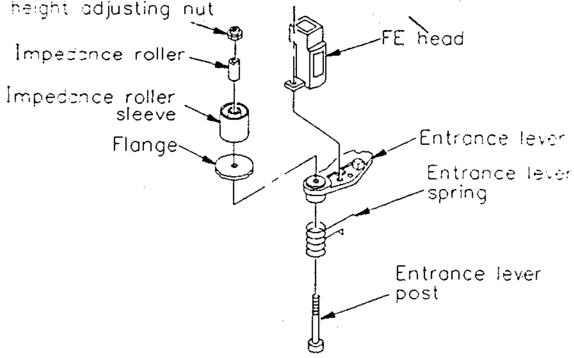

Impedance roller height adjusting nut
FE head mounting screw
FE head
Impedance roller
Impedance roller sleeve
Flange
Entrance lever
Entrance lever spring
Entrance lever post

Fig. 4-3-3 Replacement of No. 3 guide and FE head

(4) Impedance roller replacement

1. Remove the impedance roller height adjusting nut and replace the impedance roller as shown in Fig. 4-3-3. Before removing the nut, note the number of threads or height exceeding the surface of the nut.
2. When mounting a new impedance roller, use the reverse procedures.
3. After replacement of the impedance roller, perform the adjustment from the linearity adjustment, item 4) in the tape transport adjustment. (Refer to item 1-5-4 (3).)

(5) S, T-guide rollers replacement

The same replacement procedures will be applied for both S and T-guide rollers.

1. Loosen the set screw shown in Fig. 4-3-4.
2. Turn the guide roller counterclockwise and remove it.
3. As the O-ring may stick to the guide roller when removed, remove the O-ring and install it on the new guide roller.
4. When remounting, perform the previous steps in reverse order.
5. After completion of the replacement, perform adjustment from the linearity adjustment item 4) in the tape transport adjustment. (Refer to item 1-4-5 (3).)

Note:

When tightening the set screw, temporarily tighten it with light pressure. If it is tightened too hard, associated adjustments can not be made.
The S-guide roller has a no mark on the upper flange and the T-guide roller has a black mark on upper flange. Do not exchange them when remounting.

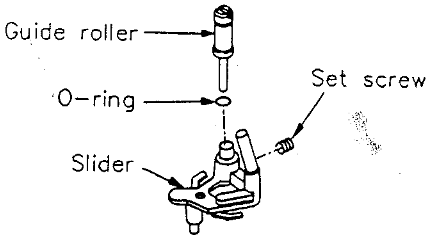


Fig. 4-3-4 Guide roller replacement

(6) S, T-sliders replacement

1. Remove the cylinder assembly.
2. Place the VTR vertically and remove the bottom cover.

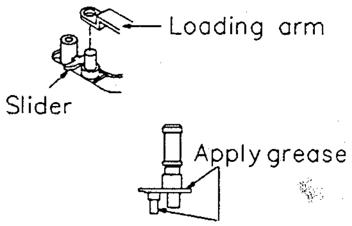


Fig. 4-3-5 S, T-slider replacement

3. Move the slider up to the loading position by turning the loading motor with your hand.
4. Remove the loading arm as shown in Fig. 4-3-5.
5. Remove the guide roller and reinstall it in a new slider according to the steps stated in (5).
6. When replacing the slider, perform the previous steps in reverse order.
7. After completion of the replacement, perform the rough adjustment in the tape transport system adjustment. (Refer to item 1-5-4 (3)).

Note:

When the slider is replaced, always apply grease to the slider receptacle as shown in Fig. 4-3-5.

(7) No. 9 guide lever assembly replacement

1. Remove the front loading assembly.
2. Remove the pinch lever assembly.
3. Remove the cam lever assembly.
4. Remove the loading drive assembly.
5. Remove the ACE head assembly.
6. Remove the nut and replace the No. 9 guide lever. In this case, note the number of threads exceeding the surface of the nut.
7. Reassemble the parts removed, using the reverse procedures.
(Tighten the nut until the same thread number appears.)
8. After completion of the replacement, perform the adjustment from item 6) in the tape transport adjustment. (Refer to time 1-5-4 (3).)

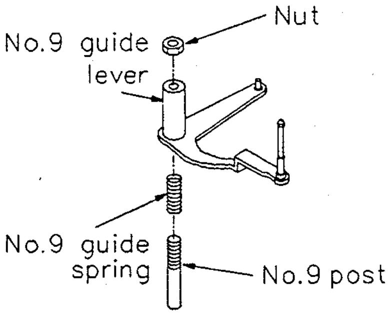
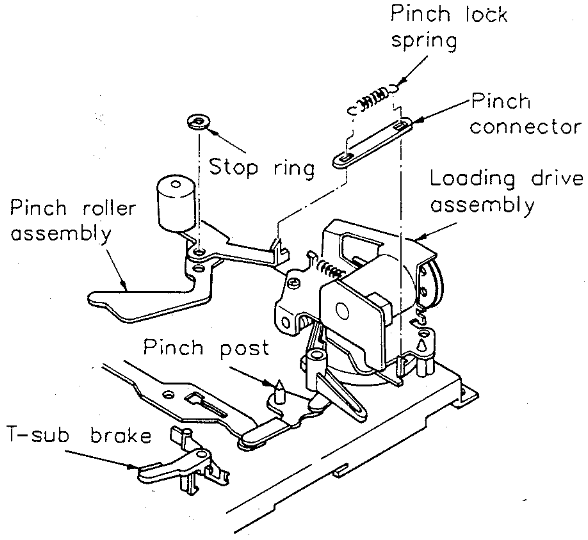


Fig. 4-3-6 No 9 guide lever replacement

1-4-4. Pinch Roller Assembly Replacement

1. Remove the pinch lock spring and disconnect the pinch connector.
2. Remove the stop ring and remove the pinch roller assembly upward.
3. Clean the pinch post and apply grease on it.
4. Replace the pinch roller assembly according to the previous steps in reverse order.
5. After replacement, make sure the T-sub brake is in touch with the T-reel table with a proper pressure.
6. After completion of the replacement, perform adjustment from item "1-5-4 (3) Tape transport system adjustment".

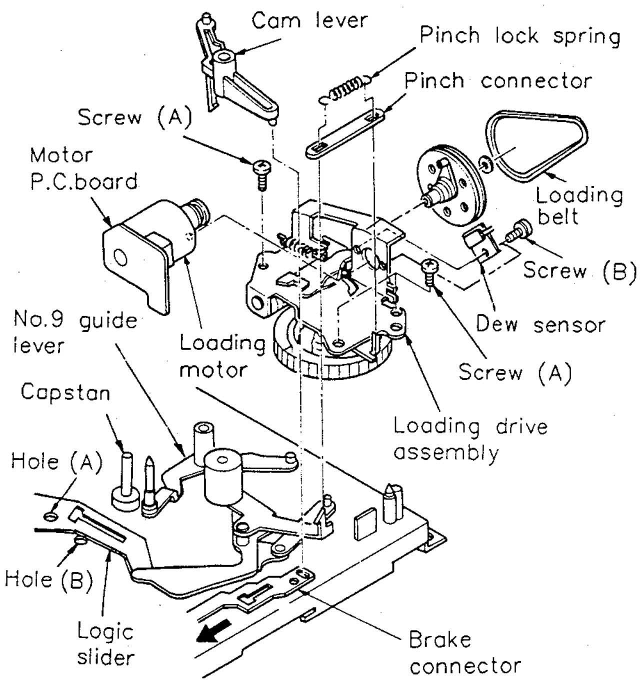


Pinch lock spring
Pinch connector
Stop ring
Loading drive assembly
Pinch roller assembly
Pinch post
T-sub brake

Fig. 4-4-1 Pinch roller replacement

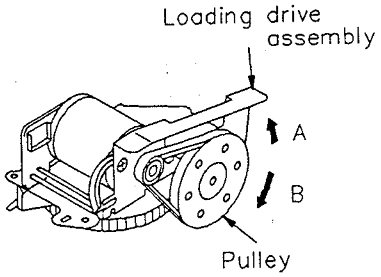
1-4-5. Loading Motor Replacement

1. Remove the motor P.C. board from the loading motor, taking care not to damage the wire harness.
2. Remove the pinch lock spring and disconnect the pinch connector.
3. Off-hook the claw hooked on the main base, using a screw driver and remove the cam lever upward.
4. Remove the screws (A) and remove the loading drive assembly.
5. Remove the loading belt and screws (B), and remove the motor.
6. When replacing the motor with a new one, perform the previous steps in the reverse order, taking care of the polarities (+) polarity should be located on the bottom leftside. In this case, also mount the dew sensor with the motor, using the screws (B). Do not touch the surface of the sensor.



Cam lever
Pinch lock spring
Pinch connector
Screw (A)
Motor P.C.board
Loading belt
Screw (B)
Dew sensor
No.9 guide lever
Loading motor
Screw (A)
Capstan
Loading drive assembly
Hole (A)
Hole (B)
Logic slider
Brake connector

Fig. 4-5-1 Loading motor replacement



Loading drive assembly
A
B
Pulley

Fig. 4-5-2 Loading drive mounting mode

7. Turn the pulley of the loading drive assembly counterclockwise (as arrow A) until it stops, and then rotate it 3 turns clockwise (as arrow B) to set the mounting mode.
8. Before mounting the loading drive assembly on the main base, position the logic slider so that its hole matches the phase matching hole (A), and then move the No. 9 guide lever until it touches the capstan.
   As the phase matching hole (A) exists near the hole (B) (1.2cm right from hole (A)), do not mistake hole (B) for hole (A).
9. Slide the brake connector in the direction shown by the arrow, and mount the cam lever.
10. Mount the pinch connector and the pinch lock spring.

1-4-6. Tension Regulator Assembly

1. Remove the tape tension spring from the tension regulator assembly.
2. Remove the screw and remove the tension regulator assembly from the main base while releasing the S-soft brake lever.
3. Clean the shaft of the new tension regulator and then apply one or two drops of oil. When replacing the tension regulator, perform the previous steps in reverse order.
4. After completion of the replacement, check position of the tension pole and its adjustment (refer to item 1-5-2) and check the back tension (refer to item 1-5-3).

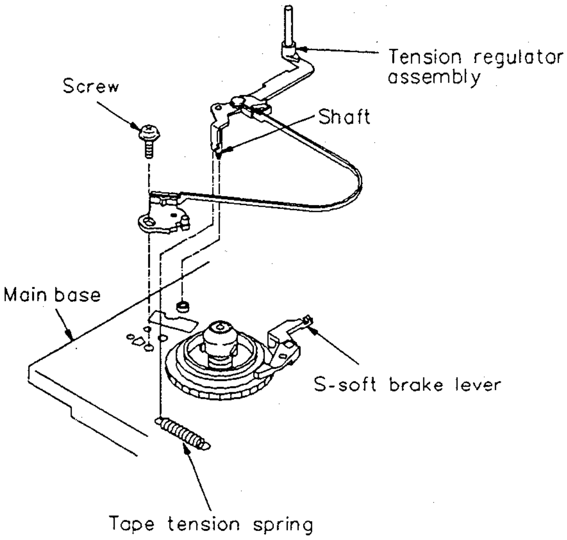

Tension regulator assembly
Screw
Shaft
Main base
S-soft brake lever
Tape tension spring

Fig. 4-6-1 Tension regulator assembly replacement

1-4-7. Cam Switch Replacement

1. Remove the screw and the cam switch assembly.
2. Apply grease to the boss section (lower than the cutout D) of the loading cam.
3. Position the cam switch assembly so that the hole (D) on the cam switch matches the cutout D on the loading cam, and then mount the cam switch with the screw.

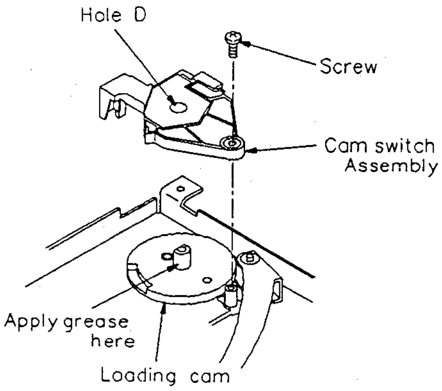

Hole D
Screw
Cam switch Assembly
Apply grease here
Loading cam

Fig. 4-7-1 Cam switch assembly replacement

1-4-8. T, S-Sensor Assemblies Replacement

1. Remove the mechanism main or sub P.C. board.
2. Desolder four sensor leads.
3. Unhook the holder claws from the P.C. board.
4. When reinstalling a new sensor, perform the previous steps in the reverse order.

Note:
Since the Hall element is glued on the sensor holder, take care the hall element is not torn off during installation.

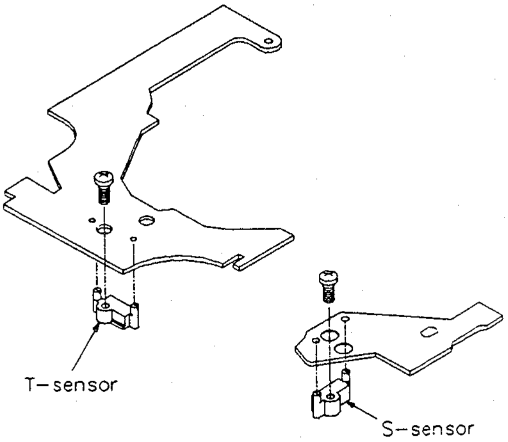

T-sensor
S-sensor

Fig. 4-8-1 Sensor assemblies replacement

1-4-9. Main Brake Assembly Replacement

1. The brake assembly has the mold claws which allow one touch installation or removal.

Note:
When replacing, take care not to touch the brake pad surface.

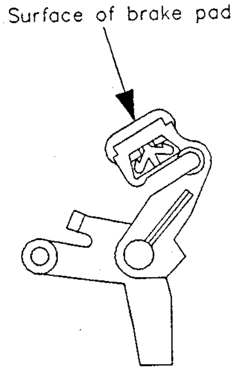

Surface of brake pad

Fig. 4-9-1 Main brake assembly replacement

1-4-10. Ground Brush Replacement

1. Remove the screw and the brush.
2. Clean the ground cap using alcohol.
3. Replace the brush.
   Mount a new brush so that it can contact the center of the ground cap.

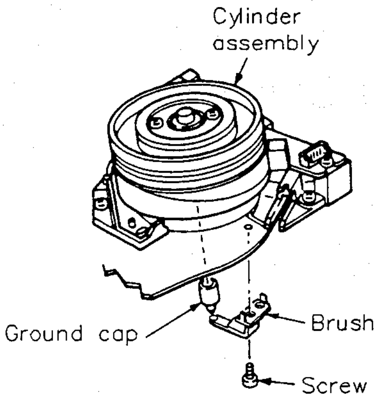

Cylinder assembly
Ground cap
Brush
Screw

Fig. 4-10-1 Brush replacement

1-4-11. Reel Table Replacement

(1) Supply reel table assembly

1. Remove the tape tension spring from the tension regulator assembly. (Also remove the mechanism sub P.C. board.)
2. Remove the screw and remove the tension regulator assembly.
3. Remove the S-reel table assembly upward paying attention not to miss the washer while releasing the S-soft brake lever in the direction shown by the arrow.
4. After cleaning the reel shaft with a cleaning kit, lubricate it with one or two drops of oil.
5. When reinstalling the S-reel table assembly to the deck, make sure the washer is replaced on the reel shaft.

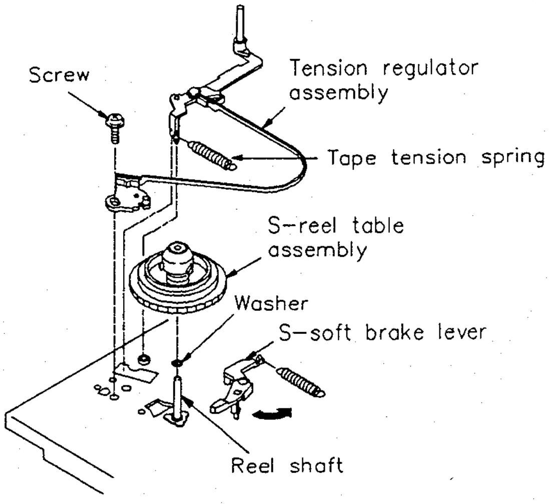

Screw
Tension regulator assembly
Tape tension spring
S-reel table assembly
Washer
S-soft brake lever
Reel shaft

Fig. 4-11-1 Supply reel table assembly replacement

6. Mount the tension regulator assembly.
7. Hook the tape tension spring onto the tension regulator assembly.

Note:

In this case, take care not to give permanent deformation to the spring.

(2) Take-up reel table assembly

1. Remove the pinch lock spring.
2. Remove the pinch connector.
3. Remove the pinch roller assembly.
4. Remove the reverse brake spring from the reverse brake assembly.
5. Remove the reverse brake assembly from the main base. In this case, move the reverse brake in the direction shown by the arrow to remove the brake assembly at a larger hole of the main base.
6. Remove the T-reel assembly.
7. As the bearing is stained with oil, the washer may stick to the T-reel table assembly and be removed with it. Take care not to miss them.
8. Clean the reel shaft using a cleaning kit, and apply one or two drops of oil after the reel shaft has dried.
9. Replace the take-up reel with a new one.

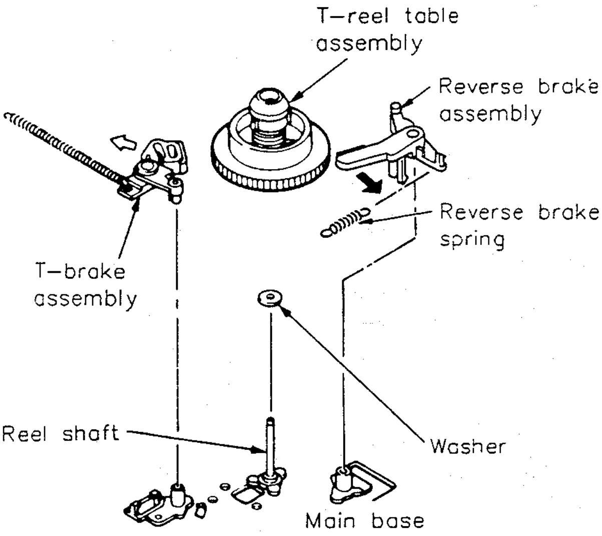

T-reel table assembly
Reverse brake assembly
Reverse brake spring
T-brake assembly
Reel shaft
Washer
Main base

Fig. 4-11-2 Take-up reel table assembly replacement

1-4-12. Direct Gear Assembly Replacement

1. Turn the deck upside-down and remove the reel belt.
2. Remove the flat cable (FFC) and the main relay P.C. board. (Refer to item 1-4-15 (1).)
3. Remove the gear lever spring.
4. Remove the stop ring (1) and remove the gear lever upward.
5. Remove the stop ring (2), and remove the direct gear assembly from the gear lever, taking care not to miss the washers.

6. Clean the gear post, using the cleaning kit. Apply one or two drops of oil.
7. When replacing the direct gear assembly and mounting the gear lever, make sure the washers are replaced on the gear post.
8. Apply grease to the lever post and then mount it in the reverse order.

Note:

- When inserting the stop ring (2), hold the under side of the gear post.
- When installing the gear lever spring, take care of the direction of the hook.
- Take care that the gear lever spring is not positioned over the release lever.
- Take care that the gear lever spring is not positioned over the drive base stopper.

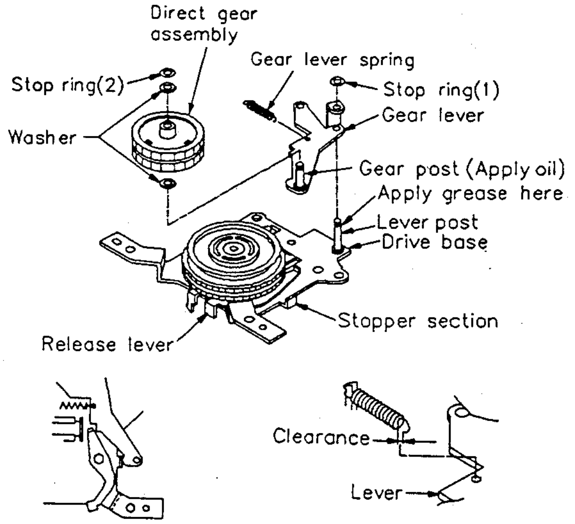

Direct gear assembly
Gear lever spring
Stop ring(2)
Stop ring(1)
Gear lever
Washer
Gear post (Apply oil)
Apply grease here
Lever post
Drive base
Stopper section
Release lever
Clearance
Lever

Fig. 4-12-1 Direct gear assembly replacement

1-4-13. Clutch Assembly Replacement

1. Turn the deck upside-down and remove the reel belt.
2. Remove the stop ring, and remove the clutch assembly upward. Take care not to miss the washers.
3. Clean the clutch post using the cleaning kit, and then apply one or two drops of oil.

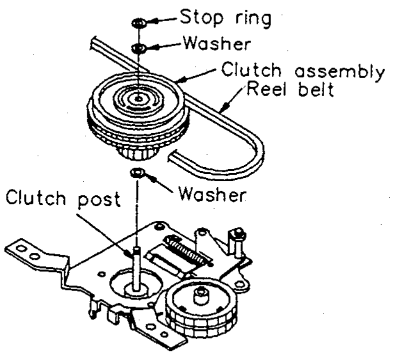

Stop ring
Washer
Clutch assembly
Reel belt
Clutch post
Washer

Fig. 4-13-1 Clutch assembly replacement

4. When replacing the clutch assembly and mounting it on the deck, make sure the washers are replaced on the clutch post.
5. When remounting, use the reverse procedures. (When mounting the belt, take care that the belt is not twisted.)
6. Check the reel torque, using the torque cassette.

1-4-14. Idle Gear Assembly Replacement

1. Turn the deck upside-down.
2. Remove the clutch as stated in item "1-4-13. Clutch Assembly Replacement".
3. Remove the direct gear assembly from the gear lever as stated in item "1-4-12. Direct Gear Assembly Replacement".
4. Place the deck in normal position.
5. Remove two screws.
6. Replace the idle gear assembly with a new one, using the reverse procedures. In this case, assemble the idle gear assembly with the shaft space (between the clutch post and gear post) set as $33.2^{+0.1}_{-0.05}$ mm. (When mounting the belt, take care that the belt is not twisted.)
7. Check the reel torque, using the torque cassette.

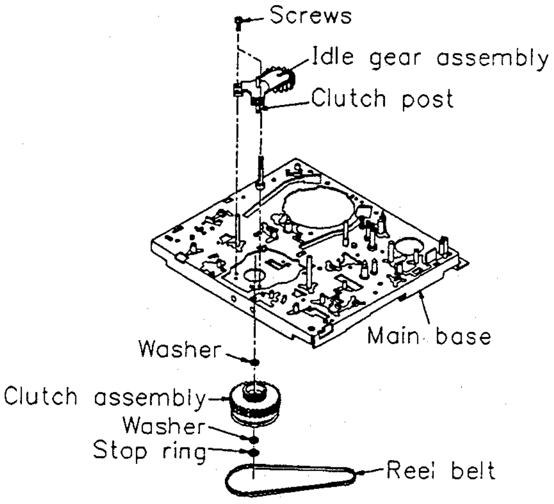
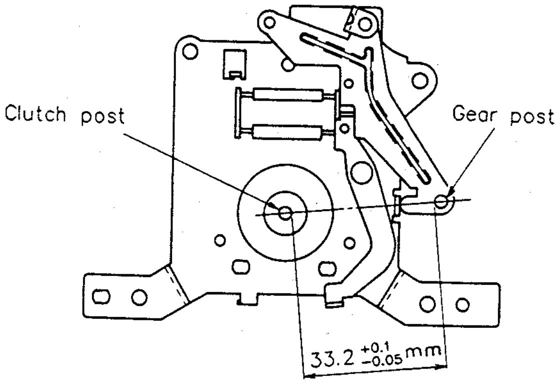

Screws
Idle gear assembly
Clutch post
Washer
Main base
Clutch assembly
Washer
Stop ring
Reel belt

Fig. 4-14-1 Idle gear assembly replacement


Clutch post
Gear post
$33.2^{+0.1}_{-0.05}$mm

(Use slide calipers.)

Fig. 4-14-2

1-4-15. Mechanism Relay P.C. Board Replacement

(1) Mechanism main P.C. board replacement

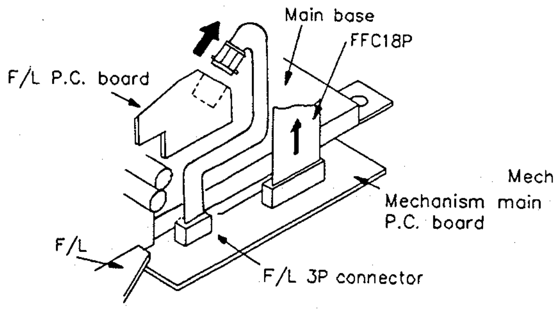
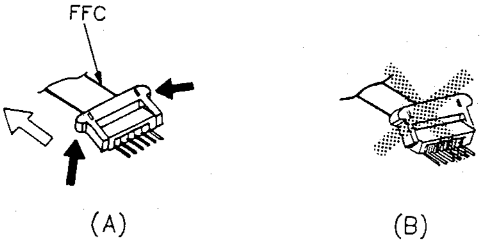

Main base
FFC18P
F/L P.C. board
Mechanism main P.C. board
F/L
F/L 3P connector

Fig. 4-15-1 Main P.C. board replacement

1. Pull and disconnect the FFC18P connector in direction shown by the arrow from the mechanism main P.C. board. Next disconnect FL3P connector from the F/L P.C. board of by pulling it in direction shown by the arrow.
2. Disconnect FFC5P from the mechanism assembly, rear side by pulling it in direction shown by the arrow. Next, remove the F/L belt and the reel belt. (Fig. 4-15-3)

Note:
The F/L belt and the reel belt are different in their length, so paying attention when replacing them.

3. When disconnecting the FFC6P and the FFC10P, refer to the disconnecting method shown in Fig. 4-15-2.



(A) (B)

Fig. 4-15-2

< How to disconnect the flat cable from the FFC connector locked >
Hold the protruded parts (shown by the black arrows) of the connector and pull the connector in the direction shown by the white arrow to release the lock. Then, pull the FCC (flat cable) and the cable will be removed.

Don't pull the connector as shown in Fig. 4-15-2 (B). If pulled strongly in the direction to be opened, the cable will be damaged.
When connecting, insert the cable with the metal terminal side facing down and then use previous steps in reverse order.

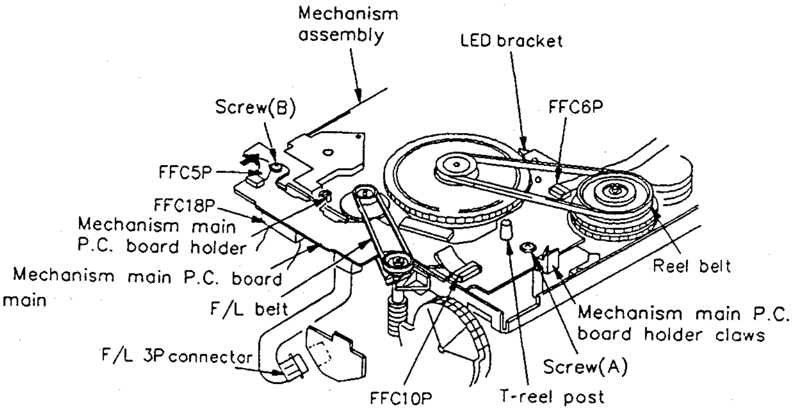

Mechanism assembly
LED bracket
Screw(B)
FFC6P
FFC5P
FFC18P
Mechanism main P.C. board holder
Mechanism main P.C. board
F/L belt
F/L 3P connector
Reel belt
Mechanism main P.C. board holder claws
Screw(A)
FFC10P
T-reel post

Fig. 4-15-3

4. Remove screw (A) and screw (B).
(Since the screws are different each other, paying attention when replacing them.)
5. Press and bend claws of the LED bracket in direction shown by the black arrows on upper side of the mechanism assembly, and then push them in direction shown by the white arrow so that they can pass the hole (Fig. 4-15-4).

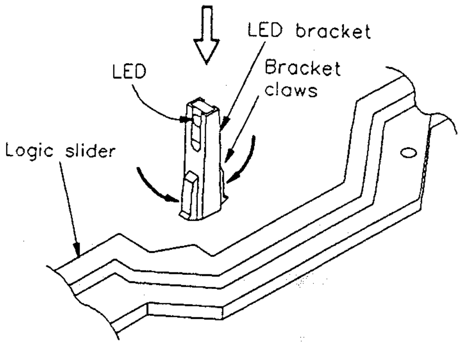

LED bracket
LED
Bracket claws
Logic slider

Fig. 4-15-4

6. Unhook the mechanism main P.C. board from the mechanism main P.C. board holding claws on the front mechanism assembly and lift the mechanism main P.C. board slightly. (Fig. 4-15-5 and 4-15-6)
7. Turn the mechanism main P.C. board in the direction shown by the shaded arrow as shown in Fig. 4-15-5, and remove the P.C. board from the mechanism main P.C. board holder section. In this case, the P.C. board will close to the F/L worm bracket, so slightly lift the P.C. board so that the P.C. board does not touch the worm bracket. Also take care not to damage the main P.C. board holder. Finally, remove the mechanism main P.C. board, paying attention not to touch the reel post.

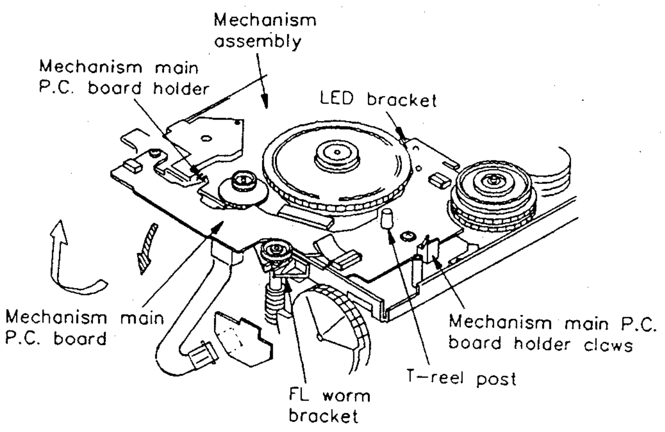

Mechanism assembly
Mechanism main P.C. board holder
LED bracket
Mechanism main P.C. board
Mechanism main P.C. board holder claws
T–reel post
FL worm bracket

Fig. 4-15-5

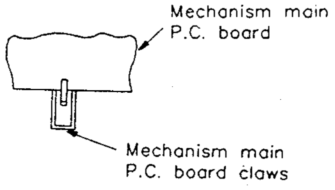

Mechanism main P.C. board
Mechanism main P.C. board claws

Fig. 4-15-6

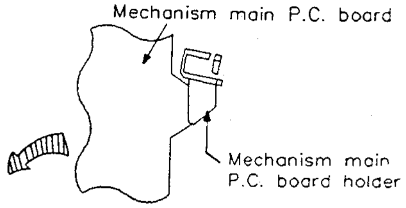

Mechanism main P.C. board
Mechanism main P.C. holder

Fig. 4-15-7

Note:

When removing or remounting, take care that the LED is not contaminated by grease or damaged by scratches. (Fig. 4-15-4)

8. When mounting, insert the LED section onto the LED bracket hole so that the claws of the LED bracket do not engage the main base completely (Fig. 4-15-8). Next, mount the P.C. board on the T-reel post and the mechanism main P.C. board holder section securely, using the previous steps in reverse order. In this case, take care that FFC5P, FFC6P, and FFC10P are not jammed between the parts.
9. Hereafter, mount the parts in reverse procedures. In this case, route the FFC6P as shown in Fig. 4-15-9.

Note:

Take care the reel belt does not touch the flat cables, etc.

Also take care the reel belt and the F/L belt are not twisted when they are installed.

10. After the replacement, make sure all parts such as connectors, belts, etc. are mounted without missing any parts. Improper connection or installation, etc. may cause erroneous operation.

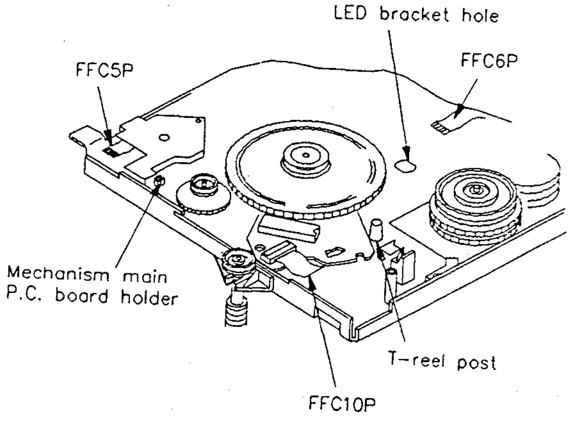

LED bracket hole
FFC5P
FFC6P
Mechanism main P.C. board holder
T–reel post
FFC10P

Fig. 4-15-8

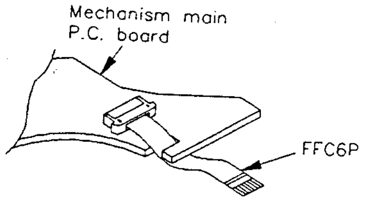

Mechanism main P.C. board
FFC6P

Fig. 4-15-9

(2) Mechanism sub P.C. board replacement

1. Disconnect the flat cable (which connects the main and the sub P.C. board) from the connector on the sub P.C. board.
2. Remove the screw.
3. Remove the sub P.C. board while opening the claws securing the sub P.C. board. In this case, take care not to damage the lens of the end sensor mounted on rear of the sub P.C. board.
4. When mounting, use the reverse procedures. Mount the sub P.C. board while turning the erase prevention lever in the direction shown by the arrow.

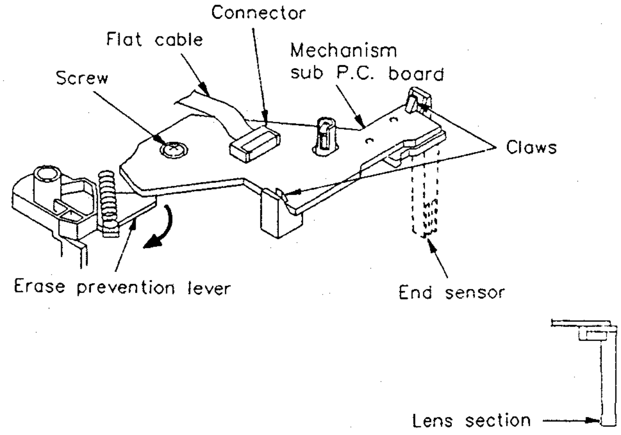

Connector
Flat cable
Mechanism sub P.C. board
Screw
Claws
Erase prevention lever
End sensor
Lens section

Fig. 4-15-10

1-4-16. Capstan Motor Replacement

1. Turn the deck upside-down.
   Remove the F/L belt, reel belt, FFC (3) for cam switch, FFC (4) for mechanism sub P.C. board, and FFC (5) for capstan motor.

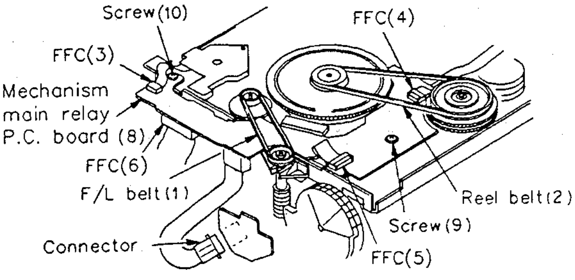

Screw(10)
FFC(4)
FFC(3)
Mechanism main relay P.C. board (8)
FFC(6)
F/L belt(1)
Reel belt(2)
Screw(9)
Connector
FFC(5)

Fig. 4-16-1

2. Replace the deck in normal position.
   Remove the FFC (6) for unit main P.C. board, and then disconnect the connector extending from the mechanism main relay P.C. board to the F/L.
3. Remove screws (9) and (10) from the rear of the deck, and remove the mechanism main relay P.C. board. (For more details, refer to item "1-4-15. Mechanism Relay P.C. Board Replacement". (Screws (9) and (10) are not the same, so do not exchange when using.)
4. Remove the FFC (3) from the capstan motor by sliding the connector holder in the direction shown by the arrow.

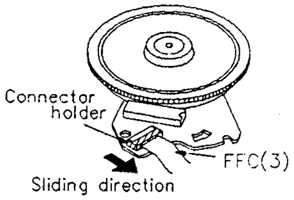

Connector holder
FFC(3)
Sliding direction

Fig. 4-16-2

5. Hold the capstan motor on the rear of the deck. Remove three screws on the front side of the deck and then remove the motor.

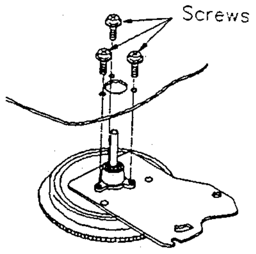


Fig. 4-16-3

6. Replace the capstan motor with a new one having the same part number.
7. First, position the capstan motor so that its direction matches to its receptacle as shown in the Fig. 4-16-4 and then mount the motor from the rear side of the deck, taking care not to damage the shaft, motor, etc. Particularly take care not to damage the F/L drive gear.

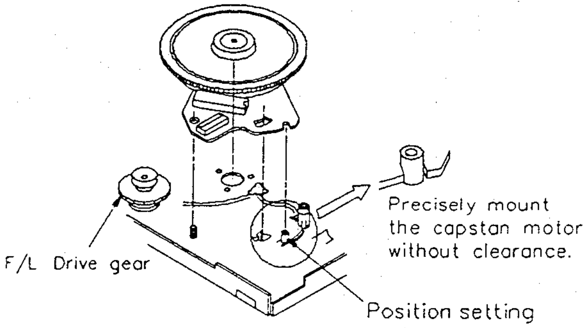

Precisely mount the capstan motor without clearance.
F/L Drive gear
Position setting

Fig. 4-16-4

8. Next, secure the capstan motor with three screws from the upper side of the deck. In this case, do not use the screws once removed. Precisely mount the motor without any clearance.

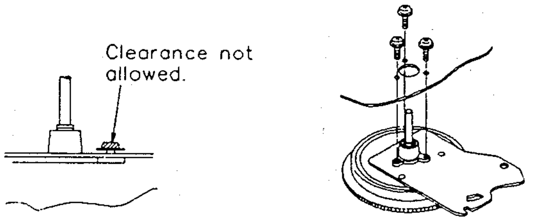

Clearance not allowed.

Fig. 4-16-5

9. Connect the FFC to the motor, taking care of its top and bottom side. It should be inserted with the metal terminal side facing downward. Insert the FFC and securely lock the connector by moving it as shown by the shaded arrow.

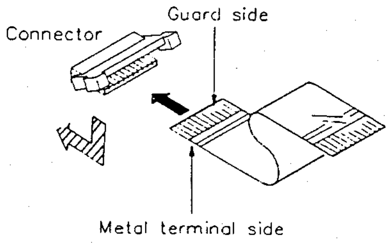

Guard side
Connector
Metal terminal side

Fig. 4-16-6

10. Hereafter, proceed the remounting, using the mounting procedures in the reverse order.
    When remounting, take care that the capstan motor, reel belt, FFC, etc. are not in contact with each other. Also take care that the belt is not twisted.
11. After completion of the capstan motor replacement, check the transport characteristics according to the transport adjustment procedure. (Refer to item 1-5-4 (3).)

1-5. Check and Adjustment

1-5-1. Phase Matching of Loading Gear

1. Turn the pulley of the loading drive assembly in a counterclockwise direction (viewed from the motor shaft) until it stops, to set the loading gear to the mounting position.
   (If the turning of the pulley is difficult, disconnect the connector from the motor P.C. board and apply a voltage of 7V to pins 1 and 2.
2. Move the S, T-sliders and tension lever to the unloading positions.

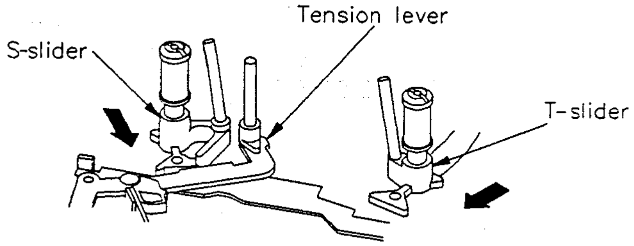

Tension lever
S-slider
T-slider

Fig. 5-1-1 Unloading position

3. Mount the T-loading gear and T-loading link assemblies on the boss provided at the T-slider (capstan side).
4. Align the two delta marks to fit the T-loading gear and S-loading gear, and then mount the S-loading gear and S-loading link assemblies.

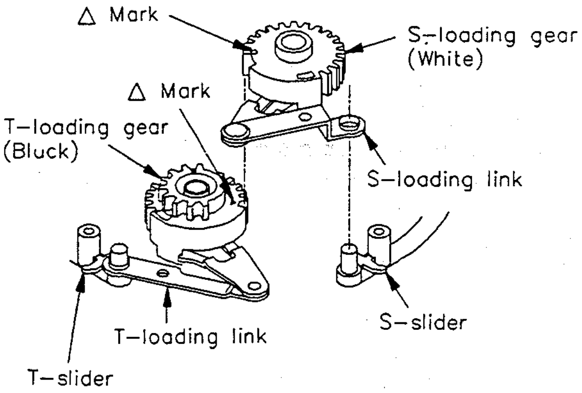

△ Mark
S-loading gear
(White)
△ Mark
T-loading gear
(Bluck)
S-loading link
S-slider
T-loading link
T-slider

Fig. 5-1-2 Loading gear mounting

5. Align the engraved mark of the loading arm and the circular hole of the T-loading gear, and then mount the loading arm.

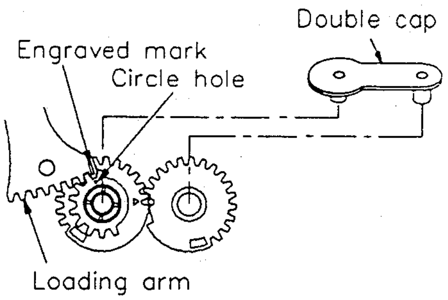

Double cap
Engraved mark
Circle hole
Loading arm

Fig. 5-1-3 Loading gear phase matching

6. Mount the double cap (larger side) to the T-loading gear side.
7. After the mounting of the parts, turn the pulley of the loading drive assembly 2 – 3 turns in the clockwise direction viewed from the motor shaft.

1-5-2. Check and Adjustment of Tension Pole Position

1. Set the deck to play mode with the front loading assembly removed.
2. Make sure the left end of the tension sleeve is 8 ± 0.5mm away from the main base edge as illustrated.
3. If necessary, loosen the screw and adjust the mounting position of the band bracket.

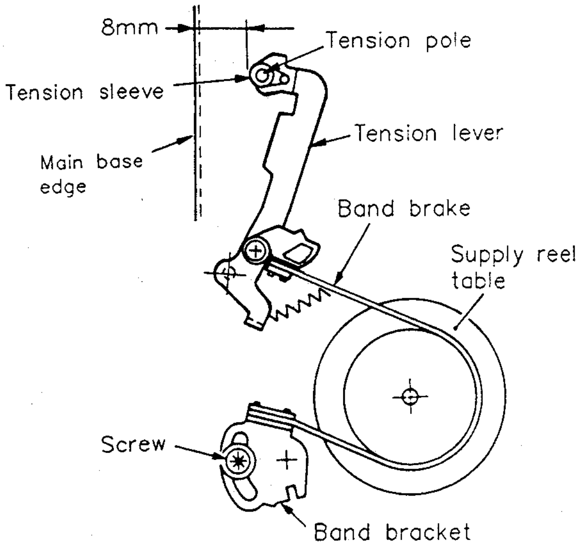

8mm
Tension pole
Tension sleeve
Tension lever
Main base
edge
Band brake
Supply reel
table
Screw
Band bracket

Fig. 5-2-1 Tension pole position

1-5-3. Reel Torque

(1) Reel torque

1. REVIEW mode
   Excessive torque will cause damage to the tape during REVIEW mode. On the other hand, poor torque may not wind the tape.
2. Record/Playback (take-up side) mode
   Too little torque does not rewind the tape to the end. If too large the tape may be stretched by excessive tension.
3. Inspection
   Rewind the torque cassette (recorded in SP mode) to the end, then check the torque values shown below.
   Review 160 ± 20g-cm
   Record/Playback 70 – 130g-cm

For checking the method, refer to the following item "(2) Reel torque check".

(2) Reel torque check

1. First, record a TV broadcast program on the entire torque cassette tape (KT-300NR).
2. Load the torque cassette in the VTR and feed forward the tape before proceeding with measurement.
3. Set the VTR to the REVIEW mode and feed the tape for about 15 sec., and then make sure the take-up torque of 160 ± 20g-cm is obtained while observing the left torque meter.
4. After completion of step 3, set the VTR to the PLAY mode and feed the tape for about 30 sec. Read the right torque meter and check the torque of 70 – 130g-cm is obtained.
5. When the review torque and playback torque are out of limit, replace the clutch assembly.
6. When the clutch assembly and the idle gear are replaced, perform the reel torque check.
7. Confirmation and adjustment of the back tension are performed by using a back tension cassette gauge.
   First, make sure that the tension pole is positioned correctly. (Refer to item 1-5-2).
   Load a back tension cassette and set the VTR to the PLAY mode.
   Make sure the meter is indicating 45 – 75 gf-cm.
   If the value is out of limit, first make sure the tension level spring is normal, and then replace the tension regulator assembly as required. (Refer to item 1-4-6).

PRECAUTIONS FOR USE OF TORQUE CASSETTE (KT-300NR)

1. Before loading a torque cassette in a VTR, always remove tape slack. The tape slack can be removed by rotating the reel to its take-up direction. (The tape tends to slack when there is no reel brake actions.)
2. When the torque cassette is loaded, confirm followings:
   a. Make sure the tape does not ride up or over the No. 8 cap. If it does, do not eject the tape but bring the tape to its correct position, taking care not to damage the tape.
   b. Make sure the tape is not slackened, if slackened, operate the VTR in FF or REW mode and then stop the tape. Then make sure the tape is not slackened again.
   c. After above confirmation, proceed to the reel torque adjustments and confirmation.
3. Cautions for removal of torque cassette
   a. When removing the torque cassette from the VTR, set the VTR to the STOP mode and wait for several seconds. Then, make sure the tape is not slackened. Push the EJECT button to remove the cassette.
   b. When removing the torque cassette from the VTR, also make sure the tape is not slackened inside the cassette lid before pulling the cassette from the VTR. If the tape is slackened inside the lid, carefully bring the tape in place and then pull the cassette.
4. If the previous precautions 1, 2 and 3 are not performed properly, the tape may be damaged and correct measurements can not be performed.
5. Do not use worn out or damaged tape, if used they may damage video heads on the cylinder. In such a case always replace the tape with a new one.
   The replacement tape is of E-180 type, 6.01 ± 0.3m in length.

1-5-4. Tape Transport System

The tape transport system has been precisely adjusted in the factory, so no check and alignment are necessary except the followings:

- Noises observed on the screen
- Tape damage
- Parts, shown in the adjustment procedures for the tape transport system, item 1-4-3, were replaced.

<Adjustment reference>

Lower flange height of No. 8 guide is used as the basic reference for the transport adjustment. To keep height of the No. 8 guide, do not apply excessive force onto the main base to prevent the main base from deformation.

(1) Location of tape transport adjustment

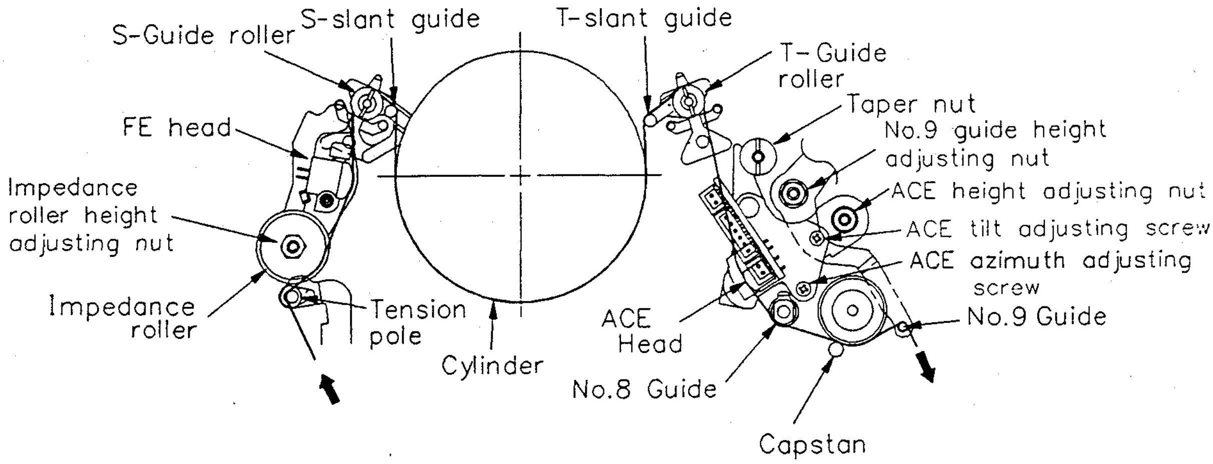

S-Guide roller
S-slant guide
T-slant guide
T-Guide roller
FE head
Taper nut
No.9 guide height adjusting nut
ACE height adjusting nut
Impedance roller height adjusting nut
ACE tilt adjusting screw
ACE azimuth adjusting screw
Impedance roller
Tension pole
Cylinder
ACE Head
No.9 Guide
No.8 Guide
Capstan

Fig. 5-4-1 Location of tape transport adjustment

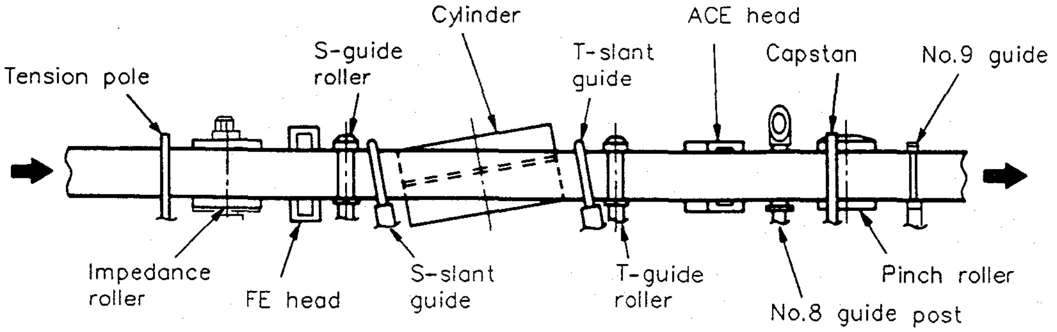

Cylinder
ACE head
Tension pole
S-guide roller
T-slant guide
Capstan
No.9 guide
Impedance roller
FE head
S-slant guide
T-guide roller
Pinch roller
No.8 guide post

Fig. 5-4-2 Tape travel diagram

c. Head height adjustment

1. Play back the alignment tape.
2. Adjust the ACE height adjusting nut for maximum audio output.

d. ACE head position adjustment

1. Play back the 3 MHz (Ach) video signal on the on the alignment tape (ST-C1).
2. Place the tracking control at its center click position.

3. Trigger the oscilloscope with the video switching pulse and observe the video RF envelope waveform.
4. Turn the taper nut slowly and fix the taper nut at the position where the video envelope reaches a peak level.

Note:

- If video RF signal is not observed with the tracking control set to the center position, perform the ACE head adjustment to obtain maximum video RF envelope in each mode, again.

5. Play back the audio signal on the alignment tape (ST-C1) and make sure the audio output is maximum.

6) No. 9 guide lever adjustment

1. Set the VTR to Cue mode with E-240 tape (at beginning portion) loaded. Switch the Cue mode to the Review mode when the tape has been rewound into the T-reel table to some extent.
2. Check tape wrinkle at the upper and lower flange of No. 8 guide.
   Adjust the No. 9 height adjusting nut so that the tape runs along the lower flange.
3. Set the VTR to the Cue mode again and make sure the tape is not twisted between the capstan and the No. 9 guide. If twisted, adjust the No. 9 guide height and the adjustment in step 1 again.

Note:

When making the adjustment, do not mistake the ACE head height adjusting nut for the No. 9 adjusting nut.

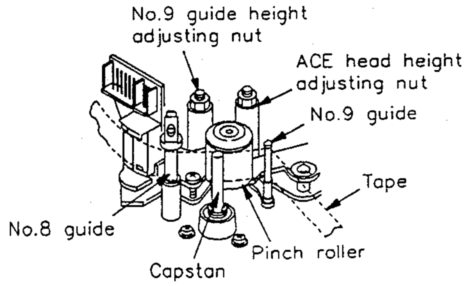

No.9 guide height adjusting nut
ACE head height adjusting nut
No.9 guide
Tape
No.8 guide
Pinch roller
Capstan

Fig. 5-4-9 No. 9 guide lever adjustment

7) Check for transitional operation from Review to Play

1. Play back the 3 MHz (Ach) video signal on the alignment tape (ST-C1) in Review mode and observe the video RF envelope with the oscilloscope.

2. Switch the Review mode to the Play mode.
   When switched to the Play mode, make sure the entrance side envelope comes to an approximate steady state within 3 seconds as shown in Fig. 5-4-10.

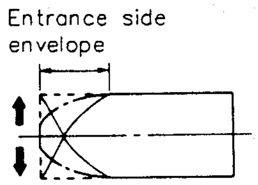


Fig. 5-4-10 Video envelope rising when operation mode is switch from review to play mode

If it does not rise within 3 seconds, adjust as follows:

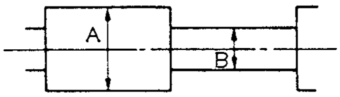
3. Turn the impedance roller nut counterclockwise to adjust the lower flange height.
   Make sure the tape travels along the lower flange.
4. Since entrance side linearity varies as the height of the lower flange of the impedance roller is varied, adjust the S-guide roller to correct the linearity.
5. Change operation mode from the Review to the Play mode again and make sure the entrance side envelope rises within 3 seconds. If not, perform the adjustment again from item 3.
6. Play back the E180 tape in the Play mode and make sure no tape wrinkle occurs at the lower flange of the impedance roller. If excessive tape wrinkle occurs, turn the impedance roller nut clockwise until the wrinkle disappears and then perform adjustment from item 4.

Note:

If the rising characteristic is poor in Review mode, screen noises may occur in synchronous editing recording.
Perform the adjustment carefully.

8) Envelope check

1. Make recordings and play back on E-180 and E-240 tapes, and make sure the playback output envelope meets the specification shown in Fig. 5-4-6.
2. In playback using the same video deck as used for the recording, (with a E-180) the video envelope should meet the specification shown in Fig. 5-4-11.



- B/A ≦ 0.55

Fig. 5-4-11 Envelope output and output level difference

3. If the performance does not meet both specifications 1 and 2 above, replace the upper cylinder assembly.
4. Confirm operation of the synchronous editing, using a beginning portion a E-180 tape.
5. If picture noises are observed at the starting position of the editing, adjust the height of the lower flange of the impedance roller again.

9) Tape wrinkle check

1. Play back the E-240 tape in the playback, Cue, Review and the frame feeding mode, and observe tape wrinkle at each guide.
2. If excessive tape wrinkle is observed at the mode shown below, perform the associated adjustments also shown below.
   a. Playback mode
      Tape wrinkle at the S, T-guide roller section
         Item 4: Linearity adjustment
      Tape wrinkle at No. 8 guide flange
         Item 1: ACE head assembly coarse adjustment
      Tape wrinkle at impedance roller flange
         Item 7: Check for transitional operations from Review to Play
   b. Review mode
      Tape wrinkle at No. 8 guide
         Item 6: No. 9 guide lever adjustment
   c. Frame feeding mode
      Tape wrinkle at No. 8 guide
         Item 4: Linearity adjustment

2. ELECTRICAL ADJUSTMENT

<Test equipment required>

Adjustment will be performed with the following test equipment.

1. Color TV (Monitor)
2. Oscilloscope, 2 CHs, 15 MHz or higher with delay system
3. Frequency counter (7 digits or higher)
4. Millivoltmeter
5. Digital voltmeter
6. Tester (20K ohm/V)
7. Audio generator
8. Audio attenuator
9. Alignment tapes
   Part code: ST-C1: 70909227
10. Alignment screw driver (jig)
11. Color pattern generator
12. Video sweep generator
13. Patch cord
    Part code: 70909331

<Color bar signal>

Color bar signals of 75% recorded on the alignment tapes are shown in Fig. 2-1-1.

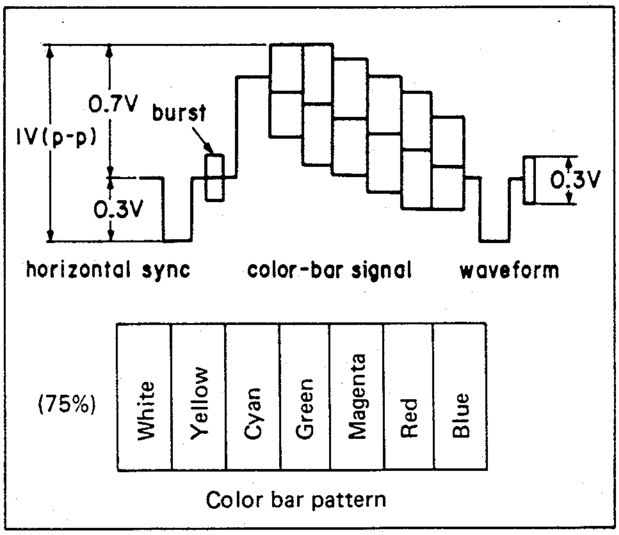
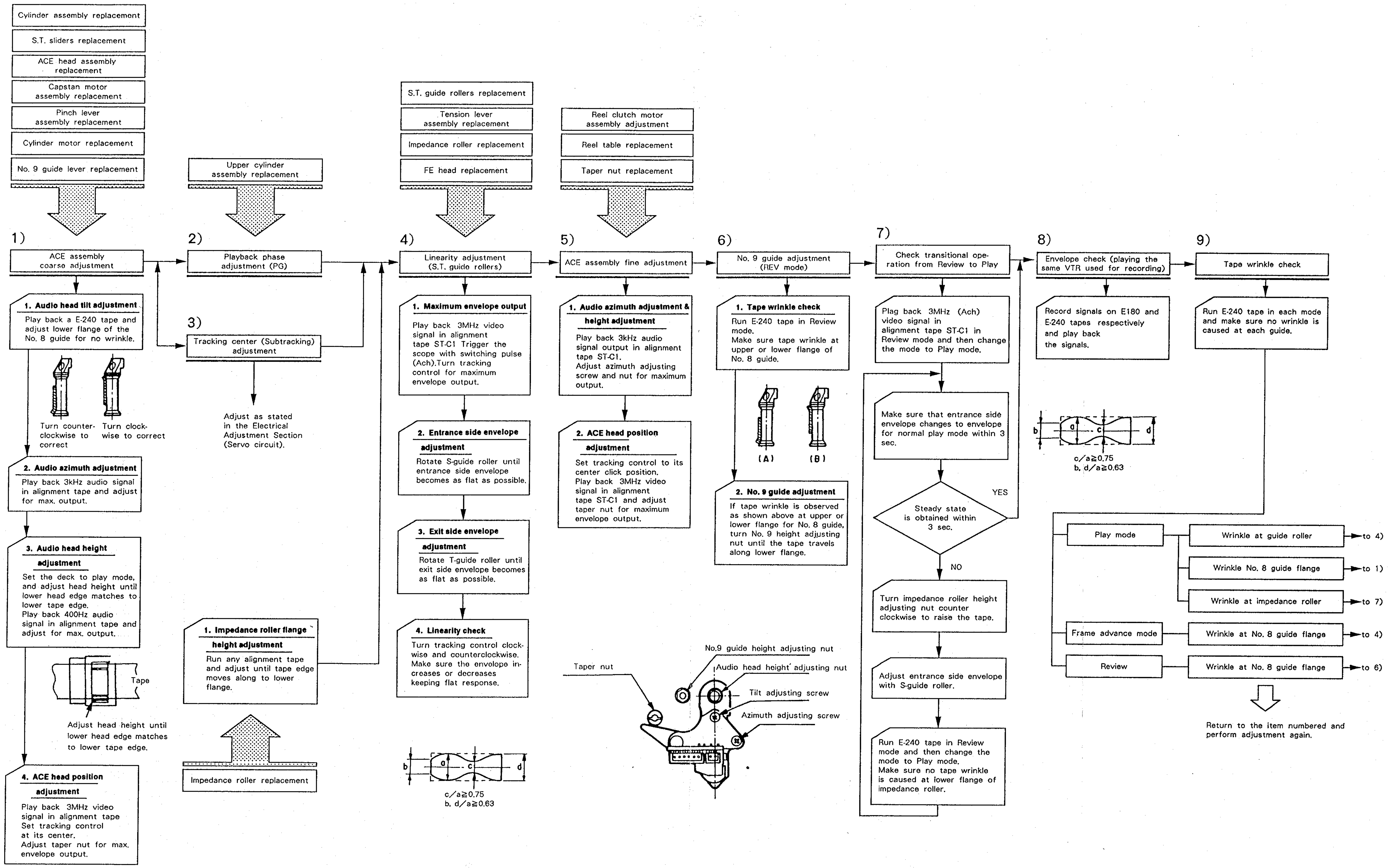


Fig. 2-1-1

(2) Tape transport system adjustment flow chart



Cylinder assembly replacement

S.T. sliders replacement

ACE head assembly replacement

Capstan motor assembly replacement

Pinch lever assembly replacement

Cylinder motor replacement

No. 9 guide lever replacement

1) ACE assembly coarse adjustment

1. Audio head tilt adjustment

Play back a E-240 tape and adjust lower flange of the No. 8 guide for no wrinkle.

2. Audio azimuth adjustment

Play back 3kHz audio signal in alignment tape and adjust for max. output.

3. Audio head height adjustment

Set the deck to play mode, and adjust head height until lower head edge matches to lower tape edge.
Play back 400Hz audio signal in alignment tape and adjust for max. output.

Adjust head height until lower head edge matches to lower tape edge.

4. ACE head position adjustment

Play back 3MHz video signal in alignment tape
Set tracking control at its center.
Adjust taper nut for max. envelope output.

Upper cylinder assembly replacement

2) Playback phase adjustment (PG)

3) Tracking center (Subtracking) adjustment

Adjust as stated in the Electrical Adjustment Section (Servo circuit).

1. Impedance roller flange height adjustment

Run any alignment tape and adjust until tape edge moves along to lower flange.

Impedance roller replacement

S.T. guide rollers replacement

Tension lever assembly replacement

Impedance roller replacement

FE head replacement

4) Linearity adjustment (S.T. guide rollers)

1. Maximum envelope output

Play back 3MHz video signal in alignment tape ST-C1 Trigger the scope with switching pulse (Ach). Turn tracking control for maximum envelope output.

2. Entrance side envelope adjustment

Rotate S-guide roller until entrance side envelope becomes as flat as possible.

3. Exit side envelope adjustment

Rotate T-guide roller until exit side envelope becomes as flat as possible.

4. Linearity check

Turn tracking control clockwise and counterclockwise. Make sure the envelope increases or decreases keeping flat response.

$c/a \geqq 0.75$
b. $d/a \geqq 0.63$

Reel clutch motor assembly adjustment

Reel table replacement

Taper nut replacement

5) ACE assembly fine adjustment

1. Audio azimuth adjustment & height adjustment

Play back 3kHz audio signal output in alignment tape ST-C1.
Adjust azimuth adjusting screw and nut for maximum output.

2. ACE head position adjustment

Set tracking control to its center click position.
Play back 3MHz video signal in alignment tape ST-C1 and adjust taper nut for maximum envelope output.

Taper nut
No.9 guide height adjusting nut
Audio head height adjusting nut
Tilt adjusting screw
Azimuth adjusting screw

6) No. 9 guide adjustment (REV mode)

1. Tape wrinkle check

Run E-240 tape in Review mode.
Make sure tape wrinkle at upper or lower flange of No. 8 guide.

2. No. 9 guide adjustment

If tape wrinkle is observed as shown above at upper or lower flange for No. 8 guide, turn No. 9 height adjusting nut until the tape travels along lower flange.

7) Check transitional operation from Review to Play

Plag back 3MHz (Ach) video signal in alignment tape ST-C1 in Review mode and then change the mode to Play mode.

Make sure that entrance side envelope changes to envelope for normal play mode within 3 sec.

Steady state is obtained within 3 sec.

YES

NO

Turn impedance roller height adjusting nut counter clockwise to raise the tape.

Adjust entrance side envelope with S-guide roller.

Run E-240 tape in Review mode and then change the mode to Play mode.
Make sure no tape wrinkle is caused at lower flange of impedance roller.

8) Envelope check (playing the same VTR used for recording)

Record signals on E180 and E-240 tapes respectively and play back the signals.

$c/a \geqq 0.75$
b. $d/a \geqq 0.63$

9) Tape wrinkle check

Run E-240 tape in each mode and make sure no wrinkle is caused at each guide.

Play mode	Wrinkle at guide roller	to 4)
	Wrinkle No. 8 guide flange	to 1)
	Wrinkle at impedance roller	to 7)
Frame advance mode	Wrinkle at No. 8 guide flange	to 4)
Review	Wrinkle at No. 8 guide flange	to 6)

Return to the item numbered and perform adjustment again.

(3) Tape transport system adjustment

- **Pre-adjustment**

When the part(s) listed in Table 5-4-1 is replaced, perform required adjustments by referring to procedures for the tape transport system.

When the part(s) listed in Table 5-4-1 is replaced, the tape path may be changed and may damage alignment tape. To prevent this, first run a E-240 tape and make sure excessive tape wrinkle does not occur at each tape guide.

1. If tape wrinkle is observed at the lower flange of the impedance roller, decreases the lower flange height.
2. If tape wrinkle is observed at the S, T-guide rollers, turn the S, T-guide rollers until wrinkle disappears.
3. If the tape wrinkle is observed at the No. 8 guide, perform the tilt adjustment of the ACE head.

Table 5-4-1

Parts replacement	Adjustment procedure
• Cylinder complete assembly • S, T-sliders • ACE head assembly • Capstan motor assembly • Pinch lever assembly • Cylinder motor • No. 9 guide lever assembly	From item 1)
• Upper cylinder	From item 2)
• S, T-guide rollers • Tension lever assembly • Impedance roller • FE haed • No. 8 guide sleeve	From item 4)
• Reel clutch assembly • Reel table (S, T) • Taper nut	From item 5)

- **Adjustment procedures**

1) ACE head assembly coarse adjustment

a. ACE tilt adjustment

1. Play back a E-240 tape and observe running condition of the tape at the lower flange of No. 8 guide.

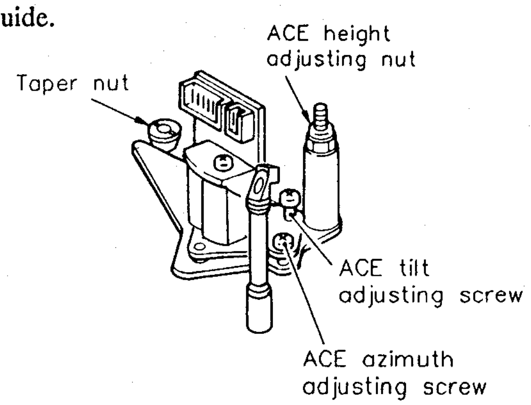


Fig. 5-4-3 ACE head assembly

2. Adjust the ACE tilt adjusting screw until tape wrinkle is caused at the lower flange of No. 8 guide as shown in Fig. 5-4-4(A).
3. Turn the ACE tilt adjusting screw counterclockwise until the tape travels along the lower flange as shown in Fig. 5-4-4(B).

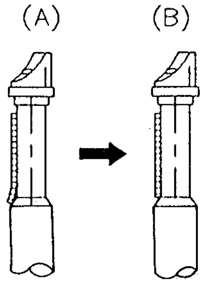


Fig. 5-4-4 No. 8 guide check

b. Audio azimuth adjustment

1. Play back the 3 kHz audio signal on the alignment tape ST-C1.
2. Connect a millivoltmeter to the audio line output terminal.
3. Turn the ACE azimuth adjusting screw to obtain maximum audio output.

c. Audio head height adjustment

1. Run the alignment tape (ST-C1) in the playback mode.
2. Observe surface of the audio head using a dental mirror.
3. Turn the ACE height adjusting nut so that lower tape edge matches to the lower edge of the control head.
4. Play back the 400 Hz audio signal in the alignment tape (ST-C1) and adjust the head height for maximum audio output.

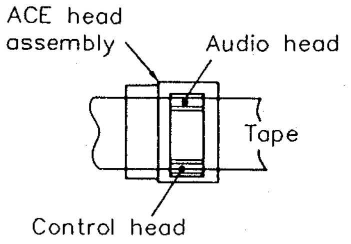


Fig. 5-4-5 Head height

d. ACE head position pre-adjustment

1. Play back the 3 MHz video signal in the alignment tape (ST-C1).
2. Adjust the taper nut for maximum video signal output after the tracking control is set at its center position.

2) Playback phase adjustment

Perform the adjustment according to the methods stated in the electrical adjustment "Servo Circuit".

3) Tracking center (Subtracking) adjustment

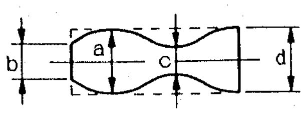
Perform the adjustment according to the methods stated in the electrical adjustment "Servo Circuit".

4) Linearity adjustment (S, T-guide rollers adjustment)

1. Play back the 3 MHz (A ch) video signal on the alignment tape (ST-C1).
2. Observe the video RF signal envelope on an oscilloscope triggered by the video switching pulse.
3. Make sure the video envelope waveform (in its maximum output) meets the specification shown in Fig. 5-4-6.

Note:

a = maximum output of the video RF envelope
b = minimum output of the video RF envelope at the entrance side
c = minimum output of the video RF envelope at the center point
d = minimum output of the video RF envelope at the exit side



b, d/a ≥ 0.63
c/a ≥ 0.75

Fig. 5-4-6 Envelope waveform adjustment

4. If the A section in Fig. 5-4-7 does not meet the specification, adjust the S-guide roller in up or down direction.
5. If the B section in Fig. 5-4-7 does not meet the specification, adjust T-guide roller in up or down direction.

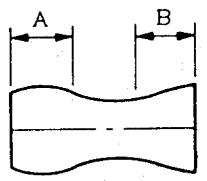


Fig. 5-4-7 Adjustment points

6. After completion of the adjustment(s), turn the tracking control and make sure video envelope variations are almost flat. Next, play back the 3 MHz signal on the alignment tape (ST-C1) and make sure the video RF envelope variations are also flat when the tracking control is turned.
7. If the envelope varies as shown in Fig. 5-4-8, adjustment of the S, T-guide rollers may be upset, if so perform the adjustment again.

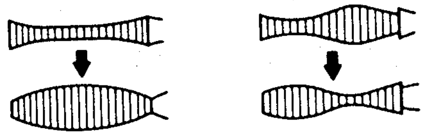


Fig. 5-4-8 Abnormal variation of the waveform

5) ACE head assembly fine adjustment

a. Tape wrinkle check at the lower flange of No. 8 guide

1. If tape wrinkle is observed at the lower flange of No. 8 guide, adjust the ACE tilt adjusting screw counterclockwise as shown in Fig. 5-4-3 until the wrinkle disappears.
2. If a gap is observed between the lower flange of No. 8 guide and the lower edge of tape, adjust the ACE tilt adjusting screw clockwise until the tape travels along the lower flange.

Note:

This adjustment should be made using a beginning part of E-240 tape.

b. Azimuth adjustment

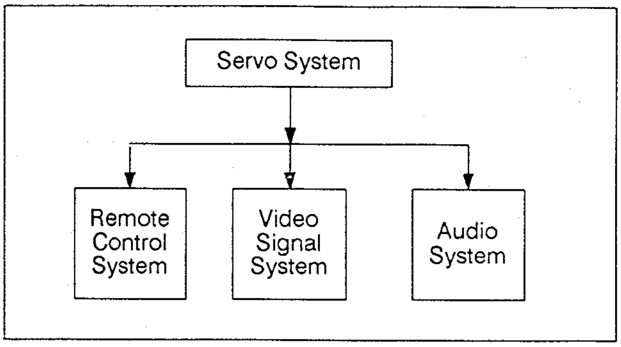
1. Play back the 3 kHz audio signal on the alignment tape (ST-C1).
2. Adjust the ACE azimuth adjusting screw for maximum audio output as shown in Fig. 5-4-3.

<Specified input and output levels, and impedance>

Video input:	Negative sync, standard composite video signal 1Vp-p, 75 ohm
Video output:	Same as the video input. 1Vp-p, 75 ohm
Audio input:	–5 dBs, more than 10k ohm
Audio output:	–5dBs, less than 1k ohm

<Alignment sequence>

Proceed the alignments in the sequence as shown in Fig. 2-1-2.



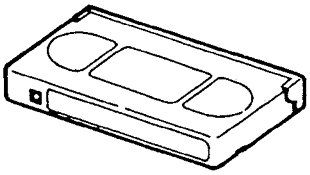


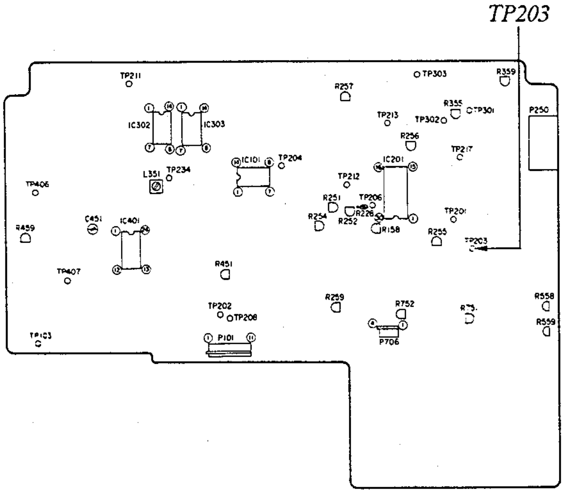
Fig. 2-1-2

Alignment tape specifications

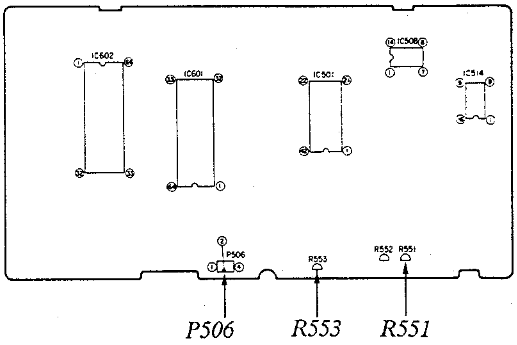
[1] ST-C1

Segment	System	Playback Time (min.)	Video Signal	Audio Signal	Applications
1	PAL & SECAM	10	Mono Scope	1 kHz	Servo checks and adjustment
2	PAL & SECAM	10	3 MHz Ach	400 Hz	Tape path checks and adjustment
3	PAL	5	Color bar	3 kHz	Video and Sound checks and adjustment
4	SECAM	5	Color bar	3 kHz	Video and Sound checks and adjustment
5	MESECAM	5	Color bar	3 kHz	Video and Sound checks
6	NTSC	5	Color bar	1 kHz	Video and Sound checks

2-1. Servo Circuit



Main PC Board

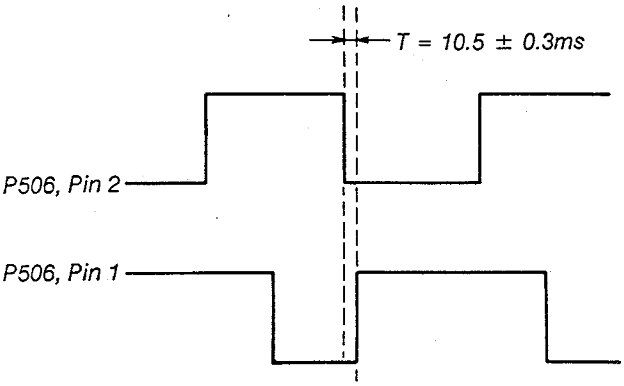


Sub Main PC Board

2-1-1. Tracking

Test point: Pin 2 of P506 (SW pulse),
Pin 1 of P506 (CTL pulse)
Test equipment: Oscilloscope (chop mode)
Adjusting point: R553

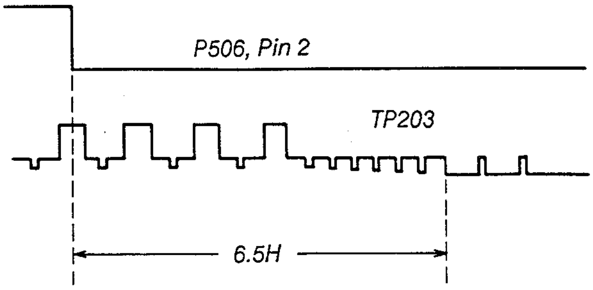
1. Place the tracking control in the center click position.
2. Play back a recorded tape.
3. Connect the A-CH input to pin 2 of P506 (SW pulse) and the B-CH to pin 1 of P506 (CTL pulse). Trigger the oscilloscope with the SW pulse.
4. Adjust R553 so that T becomes 10.5 ± 0.3ms.

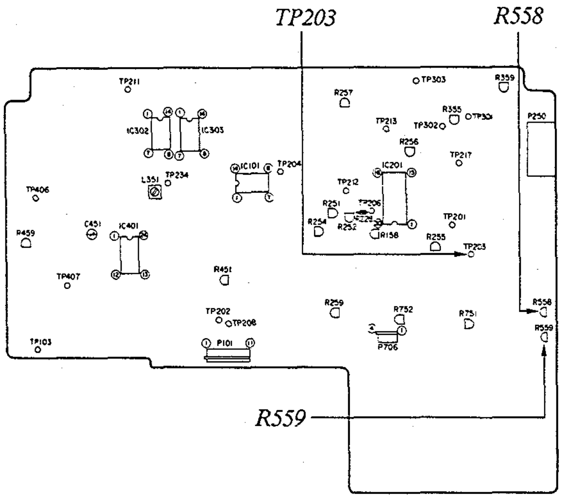


2-1-2. Playback Phase (PAL)

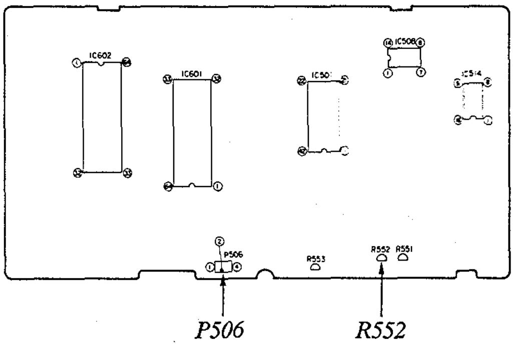
Test point: Pin 2 of P506 (SW pulse),
TP203 (VIDEO)
Test equipment: Oscilloscope (chop mode)
Adjusting point: R551

1. Playback the alignment tape (ST-C1: PAL mode). (Tracking control knob at its center click position)
2. Set the oscilloscope to the chop mode, and externally trigger the scope with the SW pulse. Connect the A-CH input to the SW pulse (Pin 2 of P506) and the B-CH to the video signal (TP203).
3. Adjust R551 to position the falling edge of the SW pulse at 6.5H ± 0.5H from the V-sync front edge of the video signal.





Main PC Board

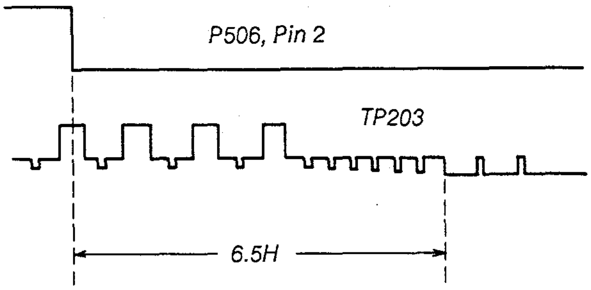


Sub Main PC Board

2-1-3. Playback Phase (NTSC)

Test point: Pin 2 of P506 (SW pulse), TP203 (VIDEO)
Test equipment: Oscilloscope (chop mode)
Adjusting point: R552

1. Playback the alignment tape (ST-C1: NTSC mode). (Tracking control knob at its center click position)
2. Set the oscilloscope to the chop mode, and externally trigger the scope with the SW pulse. Connect the A-CH input to the SW pulse (Pin 2 of P506) and the B-CH to the video signal (TP203).
3. Adjust R552 to position the falling edge of the SW pulse at 6.5H ± 0.5H from the V-sync front edge of the video signal.



2-1-4. V-sync Correction (PAL)

Test point: –
Test equipment: Color monitor
Adjusting point: R559 (on rear panel)

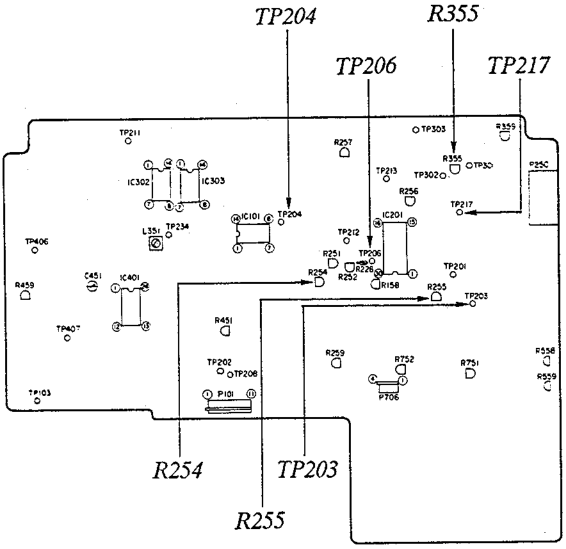
1. Play back the monoscope or color bar signal on the alignment tape ST-C1.
2. Set the VTR to still mode.
   Adjust R559 on rear panel until center part of the picture stops.

2-1-5. V-sync Correction (NTSC)

Test point: –
Test equipment: Color monitor
Adjusting point: R558 (on rear panel)

1. Play back the color bar signal on the alignment tape (ST-C1: NTSC mode).
2. Set the VTR to still mode.
   Adjust R558 on rear panel until center part of the picture stops.

2-2. Video Circuit



Main PC Board

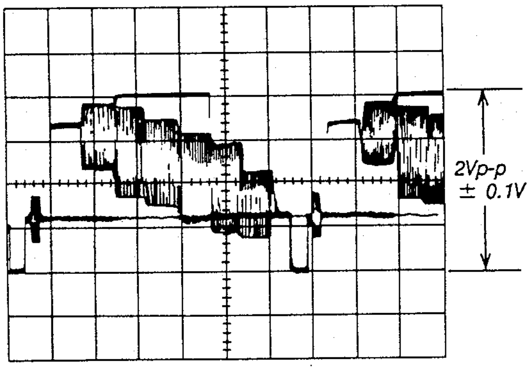
Note:

* Place the RENTAL/EDIT/HQ switch in the HQ position.

2-2-1. EE Output Level

Test point: TP203, TP204
Test equipment: Oscilloscope
Adjusting point: R355

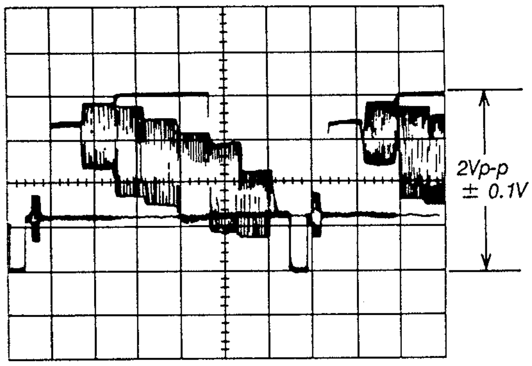
1. Feed a color bar signal (PAL) to the line input terminals and set the VTR to the EE mode.
2. Connect the oscilloscope to TP203 and trigger the scope with HD pulse at TP204.
   Adjust the scope so that a waveform is displayed for 2H period.
3. Adjust R355 until amplitude of 2.0Vp-p ± 0.1V is obtained between sync tip and 100% white level.



2-2-2. Video AGC Level

Test point: TP204, TP217
Test equipment: Oscilloscope
Adjusting point: R255

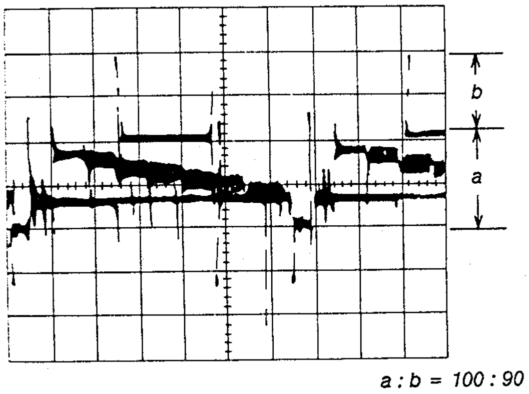
1. Feed a color bar signal (PAL) to the line input terminals and set the VTR to the EE mode.
2. Connect the oscilloscope to TP217 and trigger the scope with HD pulse at TP204.
   Adjust the scope so that a waveform is displayed for 2H period.
3. Adjust R255 until amplitude of 2.0Vp-p ± 0.1V is obtained between sync tip and 100% white level.



2-2-3. White Clip

Test point: TP204, TP206
Test equipment: Oscilloscope
Adjusting point: R254

1. Feed the PAL color bar signal to the line input terminals and set the VTR to the EE mode.
2. Connect the oscilloscope to TP206 and trigger the scope with HD pulse at TP204.
   Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust R254 so that overshoot appearing the white peak side shows 90% ± 5% of the Y signal level.



2-2-4. Sync Tip Frequency

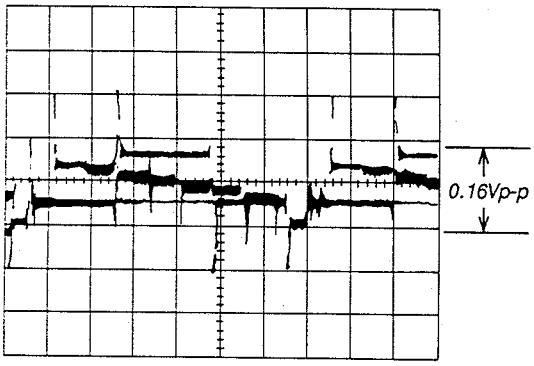
Test point: TP202
Test equipment: Frequency counter
Adjusting point: R251

1. Short circuit the line input terminals with a phone jack and set the VTR to the REC mode.
2. Connect the frequency counter to TP202.
3. Adjust R251 to obtain frequency reading of 3.81 ± 0.1MHz.

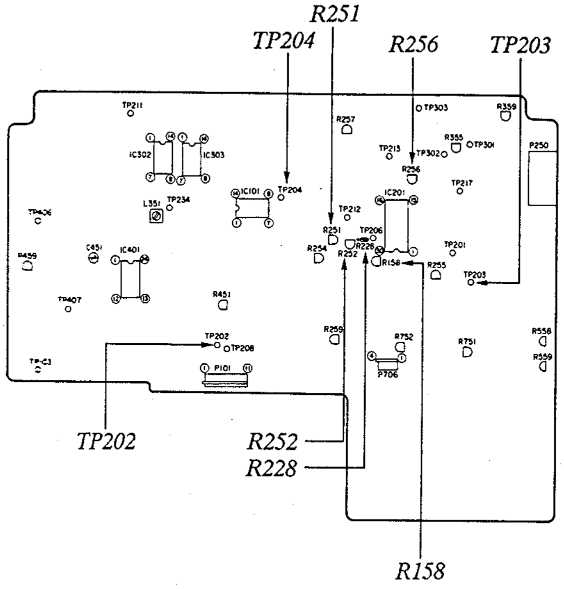
2-2-5. FM Deviation

Test point: R228 (R252 side), TP203, TP204
Test equipment: Oscilloscope
Adjusting point: R252, R256

1. Feed the color bar signal (PAL) to the line input terminal.
2. Connect the oscilloscope to R228 (R252 side) and trigger the scope with a HD pulse at TP204. Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust R252 to obtain the amplitude of approx. 0.16Vp-p between the sync tip and the white peak. After adjusting R256 (Play back Y signal output level) with the method 2-2-10, repeat above adjustment procedures, and then adjust R252 (FM deviation control) so that the playback Y signal output level at TP203 shows 2.0 ± 0.15Vp-p.



Horizontal axis: 10ms/div.
Vertical axis: 0.05V/div.

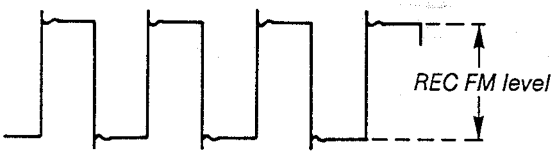


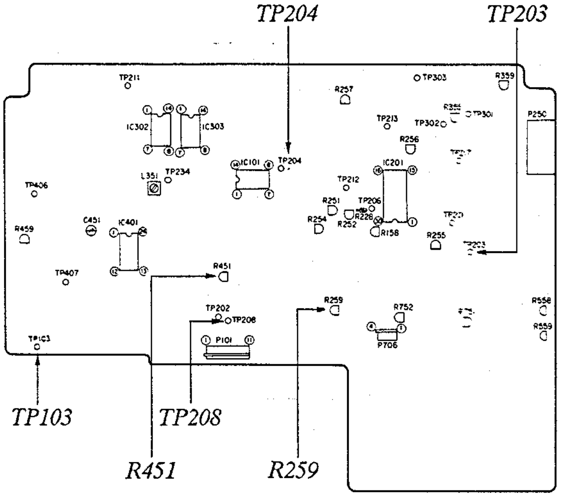
Main PC Board

2-2-6. REC FM Level

Test point: TP202
Test equipment: Oscilloscope
Adjusting point: R158

1. Connect the plug into the line input terminal and set the mode to the REC (SP) under the no signal condition.
2. Connect the oscilloscope to TP202.
3. Adjust R158 so that FM amplitude level shows 0.40 ± 0.02Vp-p.



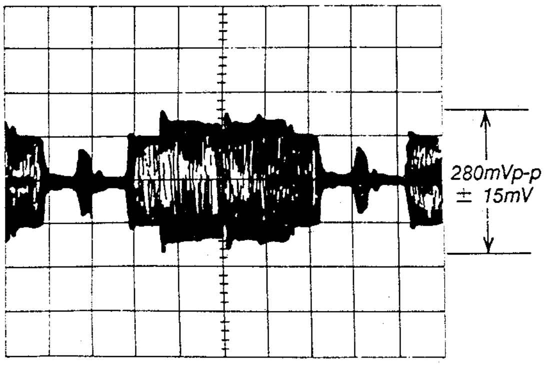


Main PC Board

2-2-7. REC Color Level

Test point: TP204, TP208
Test equipment: Oscilloscope
Adjusting point: R451

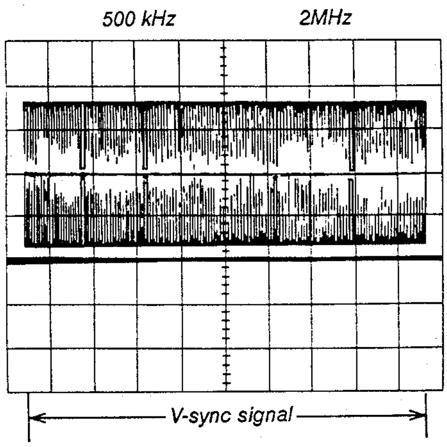
1. Feed the PAL color bar signal to the line input terminals and set the VTR to the REC (SP) mode.
2. Connect the oscilloscope to TP208 and trigger the scope with HD pulse at TP204.
   Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust R451 so that amplitude of the red portion shows 0.20 ± 0.02Vp-p.



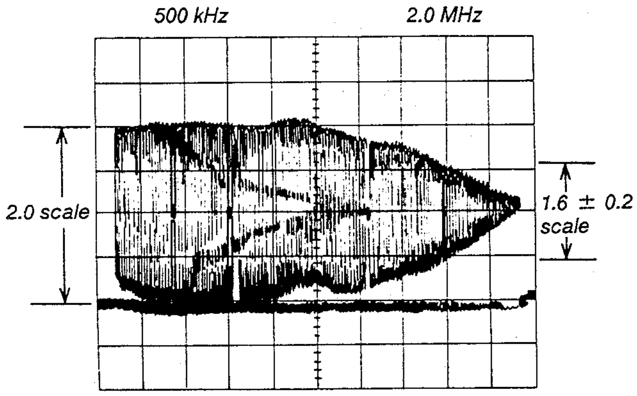
2-2-8. Picture Sharpness Preset

Test point: TP103, TP203
Test equipment: Oscilloscope
Adjusting point: R259

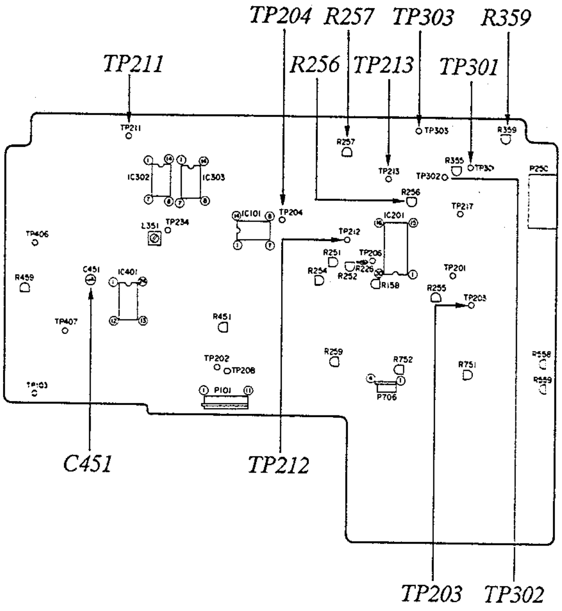
1. Place the sharpness control in its center click position.
2. Record and play back a video sweep signal fed to the line input terminals.
3. Connect the oscilloscope to TP203 and trigger the scope with a signal at TP103.
   Adjust the scope so that a waveform is displayed for more than 1V (vertical sync) period.
4. Adjust R259 so that relative amplitude at 2 MHz shows 1.6 ± 0.2 (scale), where amplitude at 500 KHz is assumed as "A" (A = 2 scale).
5. Confirm that 2 MHz level increases when the sharpness control is turned clockwise and decreases when turned counterclockwise. Then replace the control at its center click position.



Input sweep signal



Playback waveform of TP203



Main PC Board

2-2-9. VCO Frequency

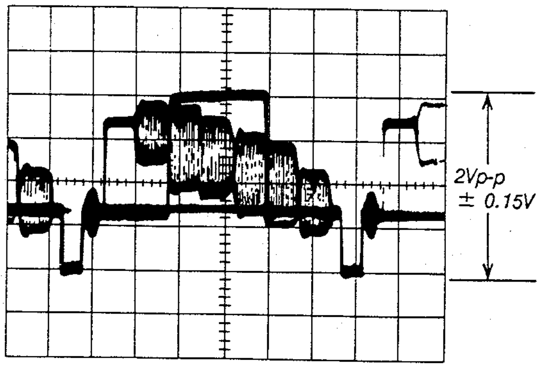
Test point: TP301, TP302, TP303
Test equipment: Frequency counter
Adjusting point: R359

1. Connect the frequency counter to TP303.
2. Connect TP301 and TP302.
3. Adjust R359 so that a frequency reading of 15.63 ± 0.1 kHz is obtained.

2-2-10. Playback Y Signal Output Level

Test point: TP203, TP204
Test equipment: Oscilloscope
Adjusting point: R256

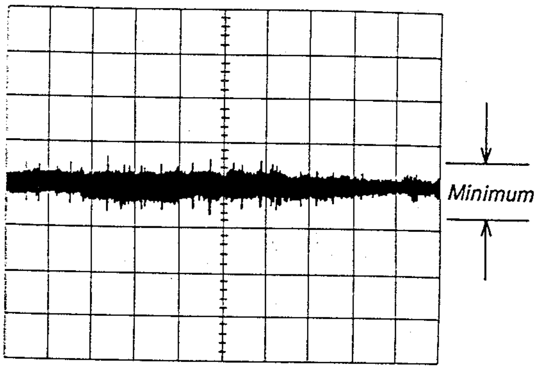
1. Play back the test tape, ST-C1 (PAL color bar signal).
2. Connect the oscilloscope to TP203 and trigger the scope with HD pulse at TP204. Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust R256 so that amplitude of 2.0Vp-p ± 0.15V is obtained between the sync tip and the 100% white level.



2-2-11. Y Comb-filter Balance

Test point: TP204, TP212, TP213
Test equipment: Oscilloscope
Adjusting point: R257

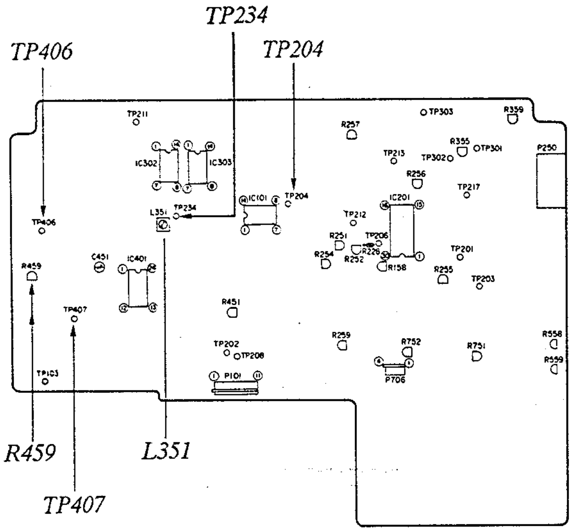
1. Play back the test tape, ST-C1 (PAL color bar signal).
2. Connect the oscilloscope (CH-1) to TP212 and the (CH-2) to TP213, and trigger the scope with HD pulse at TP204.
   Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust the scope so that amplitude gain for each channel is the same.
4. Set polarity of the CH-2 to the negative (INV) mode.
5. Set the scope to ADD mode which adds signals in the CH-1 and CH-2.
   Adjust R257 so that amplitude on the scope display shows minimum. (Ignore glitches.)



2-2-12. 4.43 MHz XO Frequency

Test point: TP211
Test equipment: Frequency counter
Adjusting point: C451

1. Play back the alignment tape, ST-C1 (PAL color bar signal).
2. Connect a frequency counter to TP211 and set the measurement range to a position which gives reading accuracy of 1 Hz.
3. Adjust C451 trimmer until the frequency reading of 4.433619 MHz ± 50 Hz is obtained.

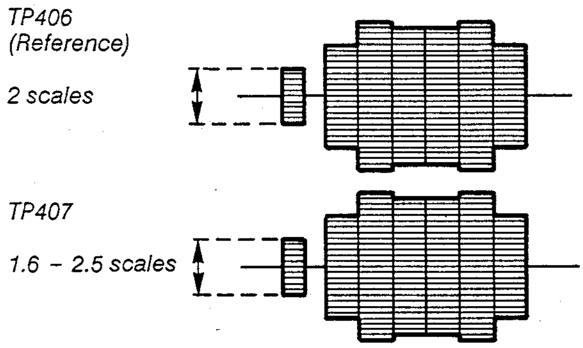

TP234
TP406
TP204
R459
L351
TP407

Main PC Board

2-2-13. LP STILL Color Level

Test point: TP204, TP406, TP407
Test equipment: Oscilloscope
Adjusting point: R459

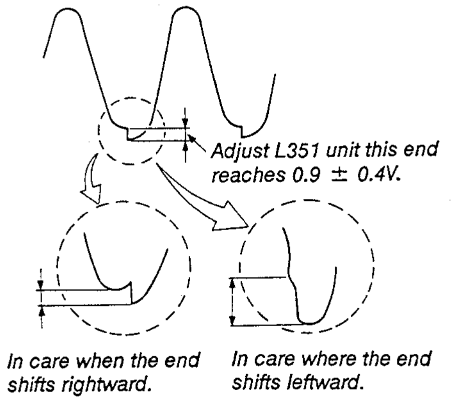
1. Play back the test tape ST-C1 (PAL Y color bar).
2. Set the video system switch to PAL mode.
3. Connect the oscilloscope to TP406 and TP407 and set the scope to the two-channel display mode. Trigger the scope with the HD pulse at TP204 and display the waveform for approx. 2H period.
4. Adjust R459 so that the burst level at TP407 becomes 1.6 – 2.5 scales with the burst level at TP406 set to 2 scales.


TP406
(Reference)
2 scales
TP407
1.6 - 2.5 scales

2-2-14. SECAM Detection Level

Test point: TP234
Test equipment: Oscilloscope
Adjusting point: L351

1. Feed the SECAM color bar signal to the line input terminal and set the VTR to REC mode.
2. Connect the oscilloscope to TP234.
3. Adjust L351 until the detector output waveform ends reaches 0.9 ± 0.4V.


Adjust L351 unit this end reaches 0.9 ± 0.4V.
In care when the end shifts rightward.
In care where the end shifts leftward.

2-3. Audio Circuit

Note:

- * Adjustments for the playback frequency response and playback output level may not be performed if the audio control head is improperly positioned on the audio track. In such a case, perform the azimuth adjustment and height adjustment perfectly, and then proceed with the adjustments 2-3-1 to 2-3-3.
- * When using alignment tapes other than those specified below always make sure that interchangeability is assured for the tapes before proceeding the adjustments.
- * Make the following adjustments with the SP/LP switch set to "SP".

2-3-1. Playback Output Level

Test point: Audio line output terminal
Test equipment: Millivoltmeter
Adjusting point: R751

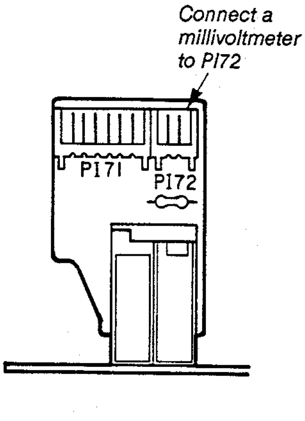
1. Connect 47K ohm to the audio line output terminal and playback the alignment tape (ST-C1).
2. Adjust R751 until output level obtains –6dBs ± 0.5 dB.

2-3-2. Bias Current

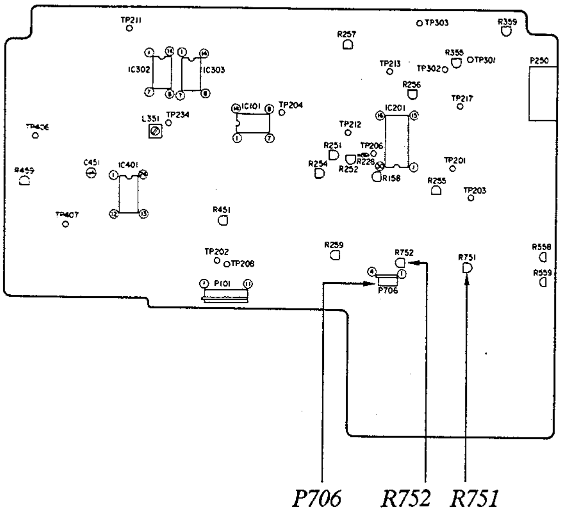
Test point: Pins 1 and 2 of PI72
Test equipment: Millivoltmeter
Adjusting point: R752

1. Short circuit the audio line input terminal, creating a no input signal condition. Connect a millivoltmeter to pins 1 and 2 (GND) of PI72.
2. Set the VTR to the record mode and adjust R752 to obtain 3.0mVrms.

Note:
Value adjusted too high lowers high frequency response and too low increases distortion.



ACE Head PC Board



Main PC Board

2-3-3. Record/Playback Output Level

Test point: Audio line output terminal
Test equipment: Millivoltmeter

1. Connect a 47K ohm resistor to the audio line output.
2. Feed 400 Hz, –8.0 dBs signal to the audio line input terminal and record the signal.
3. Confirm to see the playback output level is –6 dBs ± 3 dB.

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SECTION 3
SERVICING DIAGRAMS

1. Inspection Procedure

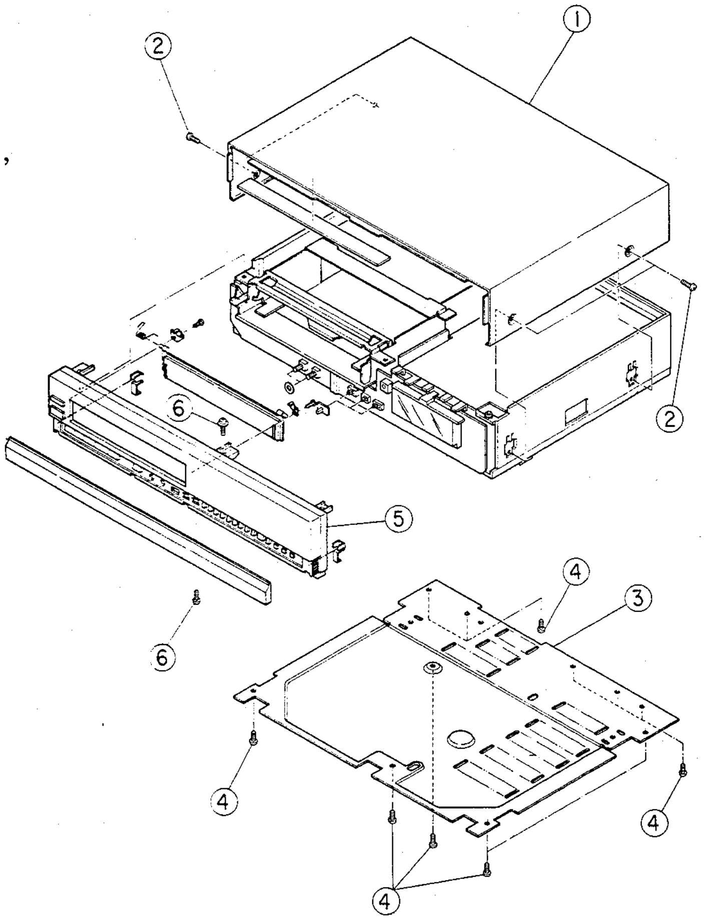
Operation steps		Items to be confirmed	Inspection block	Page	
				Block Diagram	Circuit Diagram
1. AC Plug-in	Time setting Program timer setting	Clock display Time setting operation	Power (AC system) Timer	3-11 3-13	3-36 3-45
2. Power SW ON	Timer/counter, Memory Channel selection, AFC operation, EE picture & tone quality	Mode display lamp TV receive condition, Channel select operation, AFC operation level, EE picture quality, Tone signal level	Power Logic RF reception Video (EE, Rec mode) Audio (EE, Rec mode)	3-11 3-18 3-12 3-30 3-34	3-36 3-48 3-39 3-64 3-69
3. Cassette-in and Cassette-out	Cassette-in Cassette loading Eject Cassette-out	F/L mecha. operation Cassette loading operation Eject operation Indicator lamp Abnormal sound	Logic	3-18	3-48
4. Key entry operation Remote control	REC, PLAY Cue/Review Still, Frame feeding/slow FF/REW Memory	Indicator lamp Each mode operation (Tape drive operation) Abnormal sound Memory operation	Logic Remote control	3-18	3-48 3-72
5. Special Functions Fully Automatic Play Auto Rewind	Cassette-in at Power OFF REC/PLAY/CUE	Power ON, Cassette down Automatic Play Power OFF after REW Rewind automatically after tape wound	Power Logic	3-11 3-18	3-36 3-48
6. Playback Function Picture Sharpness Tone Quality Others	PLAY (Test tape: ST-C1) Cue/Review Still/Slow	Resolution, S/N Hue, Saturation, Color unevenness, Color dropout, Sound distortion, Level variation, Picture noise, Jitter Picture swing, Skew distortion, Flicker, Beat	Video PLAY system Audio PLAY system Servo system	3-30 3-34 3-26	3-64 3-69 3-54
7. REC/PLAY Functions Picture Sharpness Tone Quality Others	REC/PLAY	Resolution, S/N Hue, Saturation, Color unevenness, Color dropout, Sound distortion, Level variation, Picture noise, Jitter Picture swing, Skew distortion, Flicker, Beat	Video PLAY system Audio PLAY system Servo system	3-30 3-34 3-26	3-64 3-69 3-54

How to use the table

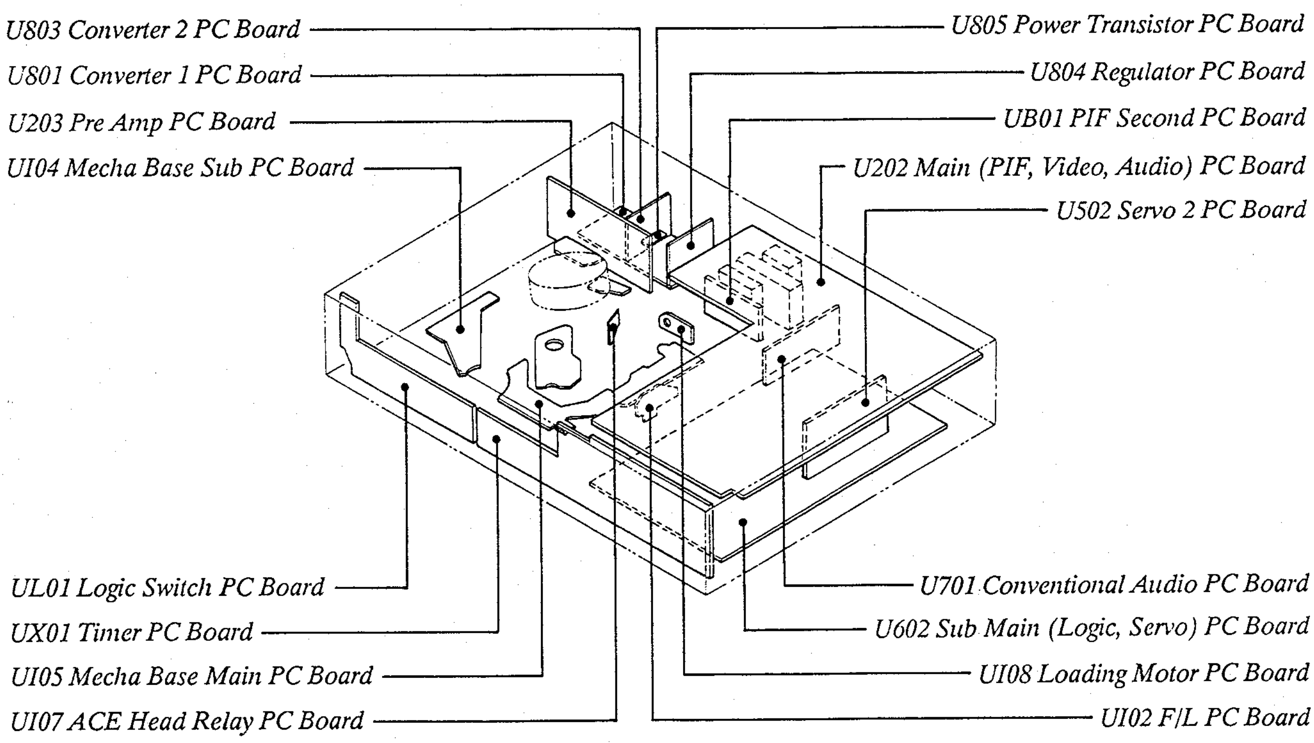
1. When inspecting a defective VTR, proceed according to the steps shown in the table.
2. Check the items to be confirmed for each operation step.
3. If a problem is found on the item, check waveforms (level) referring to the block diagram relating to the items.
4. Use PC board pattern diagram and schematic diagram to examine the circuit precisely.
5. After completion of the repair work, check steps 1 – 7 again.

2. Removal of Cabinet

1. Disconnect power cord plug from AC outlet.
2. Remove 4 screws ② securing top cover ① .
3. Remove the top cover ① by sliding it backward.
4. Remove 10 screws ④ securing bottom cover ③ , then remove the bottom cover.
5. Remove 2 screws ⑥ securing front panel ⑤ .
6. Remove the front panel ⑤.

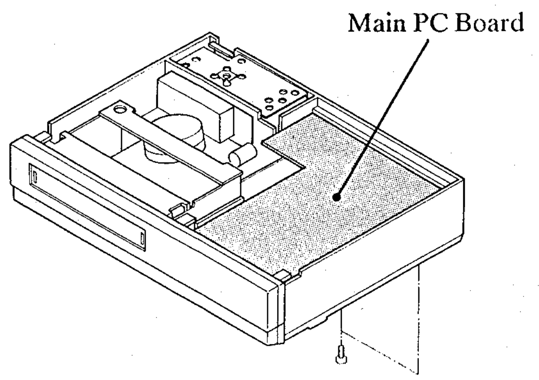

①
②
②
⑥
⑤
⑥
④
③
④
④
④

3. Electrical Units Location Diagram


U803 Converter 2 PC Board
U801 Converter 1 PC Board
U203 Pre Amp PC Board
UI04 Mecha Base Sub PC Board
U805 Power Transistor PC Board
U804 Regulator PC Board
UB01 PIF Second PC Board
U202 Main (PIF, Video, Audio) PC Board
U502 Servo 2 PC Board
UL01 Logic Switch PC Board
UX01 Timer PC Board
UI05 Mecha Base Main PC Board
UI07 ACE Head Relay PC Board
U701 Conventional Audio PC Board
U602 Sub Main (Logic, Servo) PC Board
UI08 Loading Motor PC Board
UI02 F/L PC Board

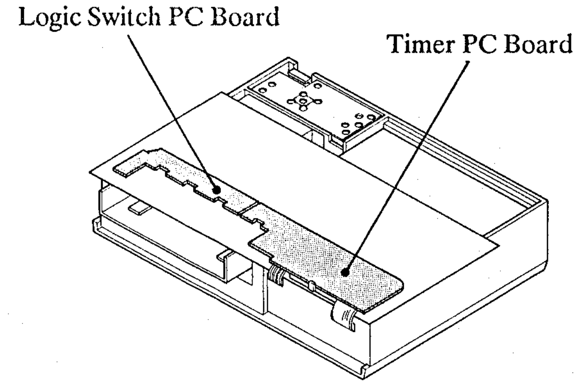
4. Standing PC Boards for Servicing

Main (PIF, Video, Audio) PC Board

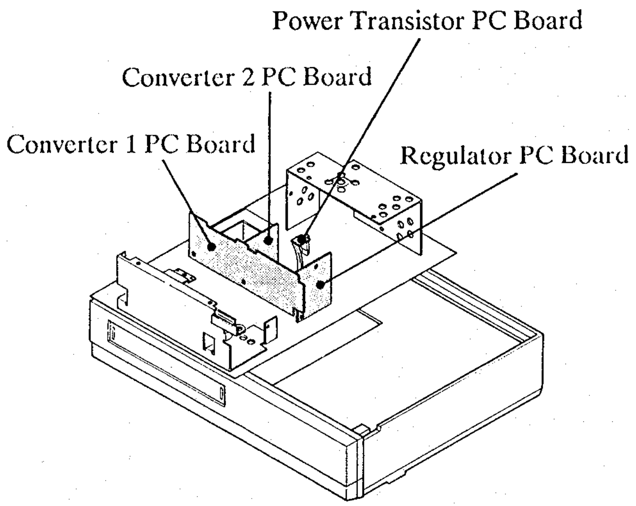

Main PC Board

Note:
Before removing the main PC Board, remove 2 screws from the top plate.

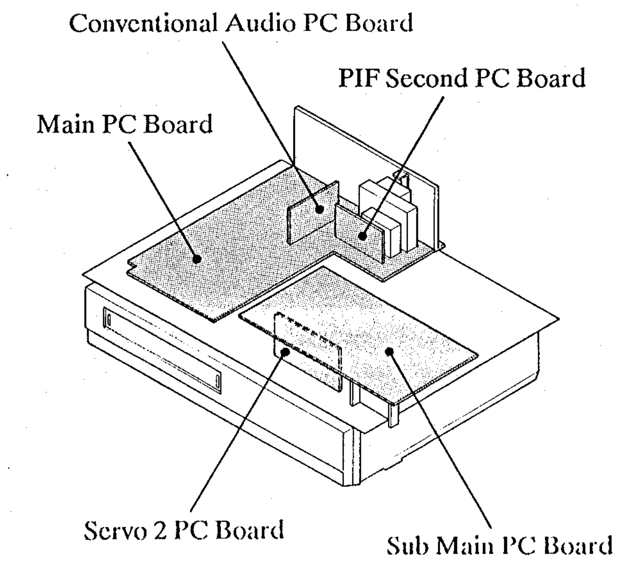
Timer , Logic Switch PC Board


Logic Switch PC Board
Timer PC Board

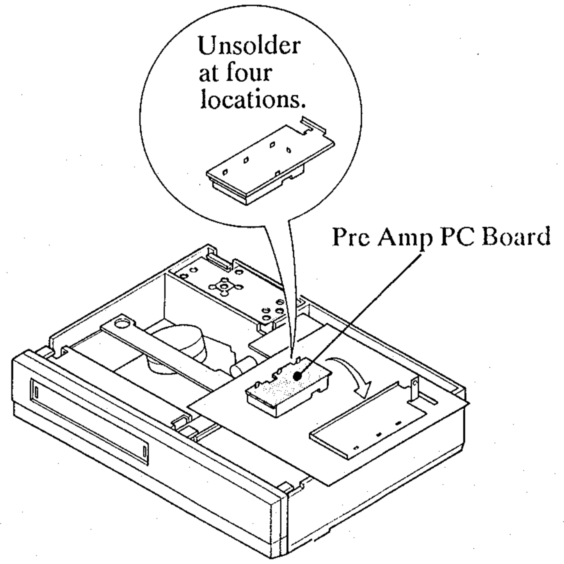
Regulator, Power Transistor, Converter 1, Converter 2 PC Board


Power Transistor PC Board
Converter 2 PC Board
Converter 1 PC Board
Regulator PC Board

Main (PIF, Video, Audio), Sub Main (Logic, Servo), PIF Second, Conventional Audio, Servo 2 PC Board


Conventional Audio PC Board
PIF Second PC Board
Main PC Board
Servo 2 PC Board
Sub Main PC Board

Pre Amp PC Board


Remove the shield plate.

Unsolder at four locations.

Pre Amp PC Board

5. Part Configuration and their Symbols

1. ICs

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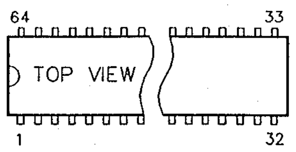
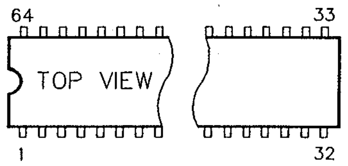
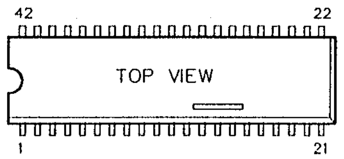
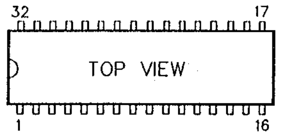
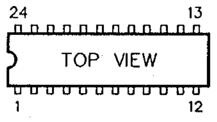
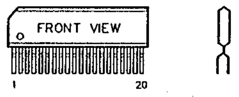
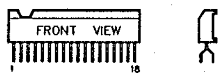
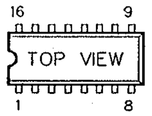
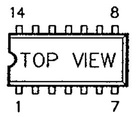
M50957-217SP	
TMP47C860N-P031 TMP47C860N-P028	
TD6372N-E3	
BA7765AS	
TA8757N AN3385NK	
AN3247NK	
BA7025L	
TC4051BP TC4538BP TC4021 TC4053BP MC14512BCP	
MC14013BCP TC4030BP BA10324	

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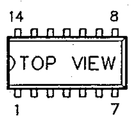
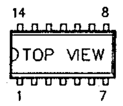
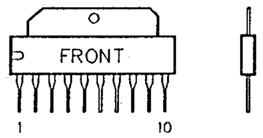
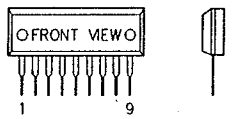
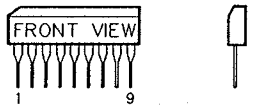
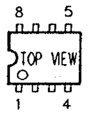
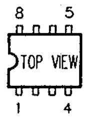
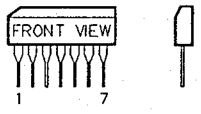
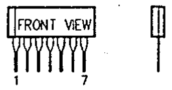
LM2902N	
LM2902N	
TA7291P	
TA8699S	
TA75393S TA75393P NJM2234S LVA519S	
BR93C46	
TL8809P	
TA7347P TA7302P	
AN5560	

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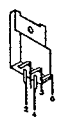
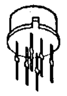
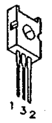
TA8710S	
LQT60X1	
PST572D PST572C	

2. TRANSISTORs

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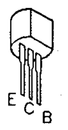
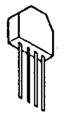
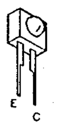
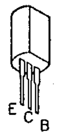
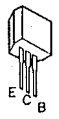
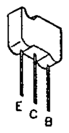
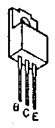
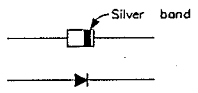
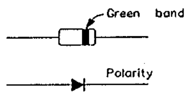
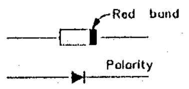
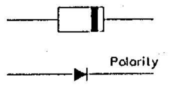
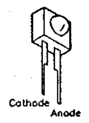
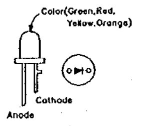
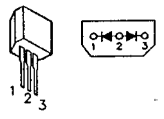
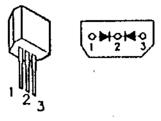
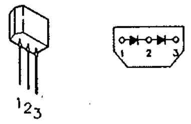
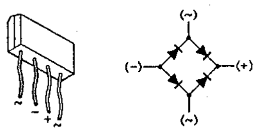
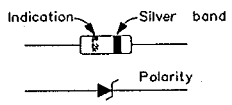
2SC1959-Y 2SC1815 Y	
THS114	
STRD1706L902 PT493F PT361F	
2SC2236-Y(C) 2SA966-Y(C)	
RN1204,RN1201 RN1206,RN1203 RN2201,RN2202 RN1202,2SC2458-Y RN2204,2SC2668-Y RN2206,2SA1048-Y	

NAME	SHAPE
2SD1198A-Q	
2SC3852 2SD1413	

3. DIODEs

NAME	SHAPE
AG01	 Silver band
1SS177 1SS176	 Green band Polarity
EQA02-05E	 Red band Polarity
S5295G 1S1832 S3LA20(S)	
GL451V	 Cathode Anode
TLG133A FA	 Color(Green,Red, Yellow,Orange) Cathode Anode

NAME	SHAPE
1SS200	
1SS201	
DA218S	
LB-156	
04AZ33Y 04AZ12Z 04AZ13Z	 Indication Silver band Polarity

NAME	SHAPE

PRECAUTIONS FOR PART REPLACEMENT

- * In the schematic diagram, parts marked ⚠ (ex. ⚠ F801) are critical part to meet the safety regulations, so always use the parts bearing specified part codes (SN) when replacing them.
- * Using the parts other than those specified shall violate the regulations, and may cause troubles such as operation failures, fire, etc.

SOLID RESISTOR INDICATION

Resistor	1/6W film	P type film	U type film	Solid	Oxide film	Metal film	Cement	Fuse
Symbol	None	P	U	S	R	W	W	RF

Tolerance	±2%	±5%	±10%	±20%
Symbol	G	J	None	None

* All film type and oxide film resistors are ±5%, so the tolerance symbol was not indicated for them.

CAPACITANCE INDICATION

Description	Symbol	Capacitance, unit	Capacitance allowance
Electrolytic	+⊣⊢	μF	Not indicated
Special electrolytic			Indicated
Plastic film	⊣⊢	μF: indicated with numbers below decimal point	Indicated below ±5% (J), indicated below ±0.5pF, not indicated for others
Ceramic		pF: indicated with numbers over decimal point	
Trimmer	⊣⊢	pF	Not indicated

Note: No working voltage is indicated for capacitors rated at 50V except electrolytic capacitors.

WAVEFORM AND VOLTAGE MEASUREMENT

- * Measurement of waveform and voltage at each section in the color circuits was conducted with sufficient service color bar signal being received and reproduced in normal conditions.
- * Waveforms and voltage values for the remaining circuit were measured with a broadcasting signal normally received, so they may vary slightly according to the programs being received. Use them as a measure for servicing.
- * All voltage values except the waveforms are expressed in DC and measured by a digital voltmeter.

CHIP PART REPLACEMENT

(Use spare part with wire leads connected.)

1. Hold a Chip part to be removed with tweezers and apply heat to the solder at one end of the part with a soldering iron. (Fig. 1)
2. Apply heat to the solder at the other end of the part and remove it.
   The heating time should be as short as possible so the excessive heat is not applied to foil patterns and the PC Board.
3. If it is difficult to remove the part, temporarily stop the desoldering job and wait until temperature of the part lowers. Then, repeat steps 1 and 2.
4. Form leads of the replacement part (general part equivalent to the chip part) as shown in the figures and solder place. (Fig. 2)
5. Mount the replacement part so that it does not touch any other parts. (Fig. 3)

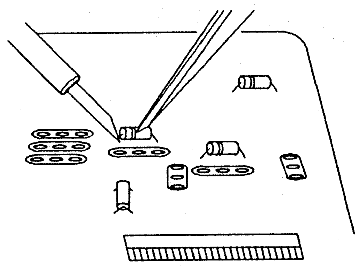


Fig. 1

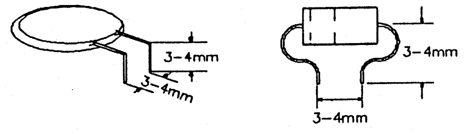


Fig. 2

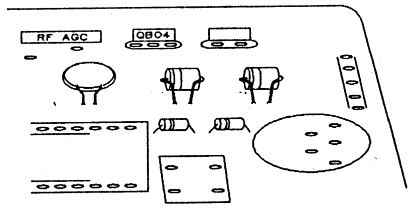


Fig. 3

REPLACING SUBMINIATURE "CHIP" PARTS

1) Required tools:

1. Fine tipped, well insulated soldering "pencil", about 300 Watts.
2. Tweezers
3. Blower type hair dryer.

2) Soldering cautions:

1. Do not apply heat for more than 3 seconds.
2. Avoid using a rubbing stroke when soldering.
3. Discard removed chips; do no reuse them.
4. Supplementary cementing is not required.
5. Use care not to scratch or otherwise damage the chips.

3) Removal (resistors, capacitors, etc.):

1. Melt the solder at one side.

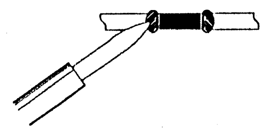


Fig. 1

2. Grasp the part with tweezers and melt the solder at the other side.

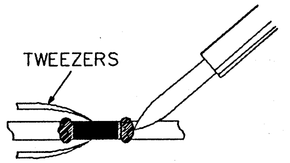


Fig. 2

3. Remove the part with a twisting motion.

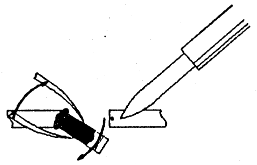


Fig. 3

4) Removal (transistors, diodes, etc.):

1. Melt the solder of one lead.

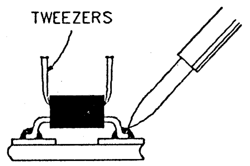


Fig. 4

2. Lift the side of that lead upward.

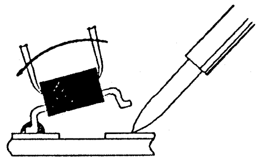


Fig. 5

3. Simultaneously heat solder the two remaining leads and lift part to remove.

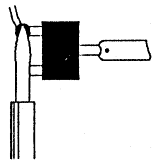


Fig. 6

5) Preheating (except for semiconductors):

Immediately before installing new resistors or capacitors, use a blower type hair dryer and preheat the part for about two minutes at approximately 150°C.

6) Replacement:

1. Presolder the contact points of the circuit pattern.

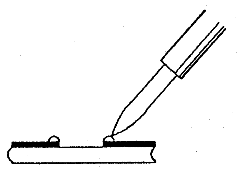


Fig. 7

2. Press the part downward with tweezers and apply the soldering pencil as indicated in the figure.

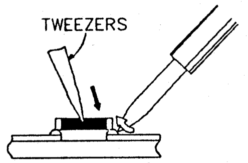
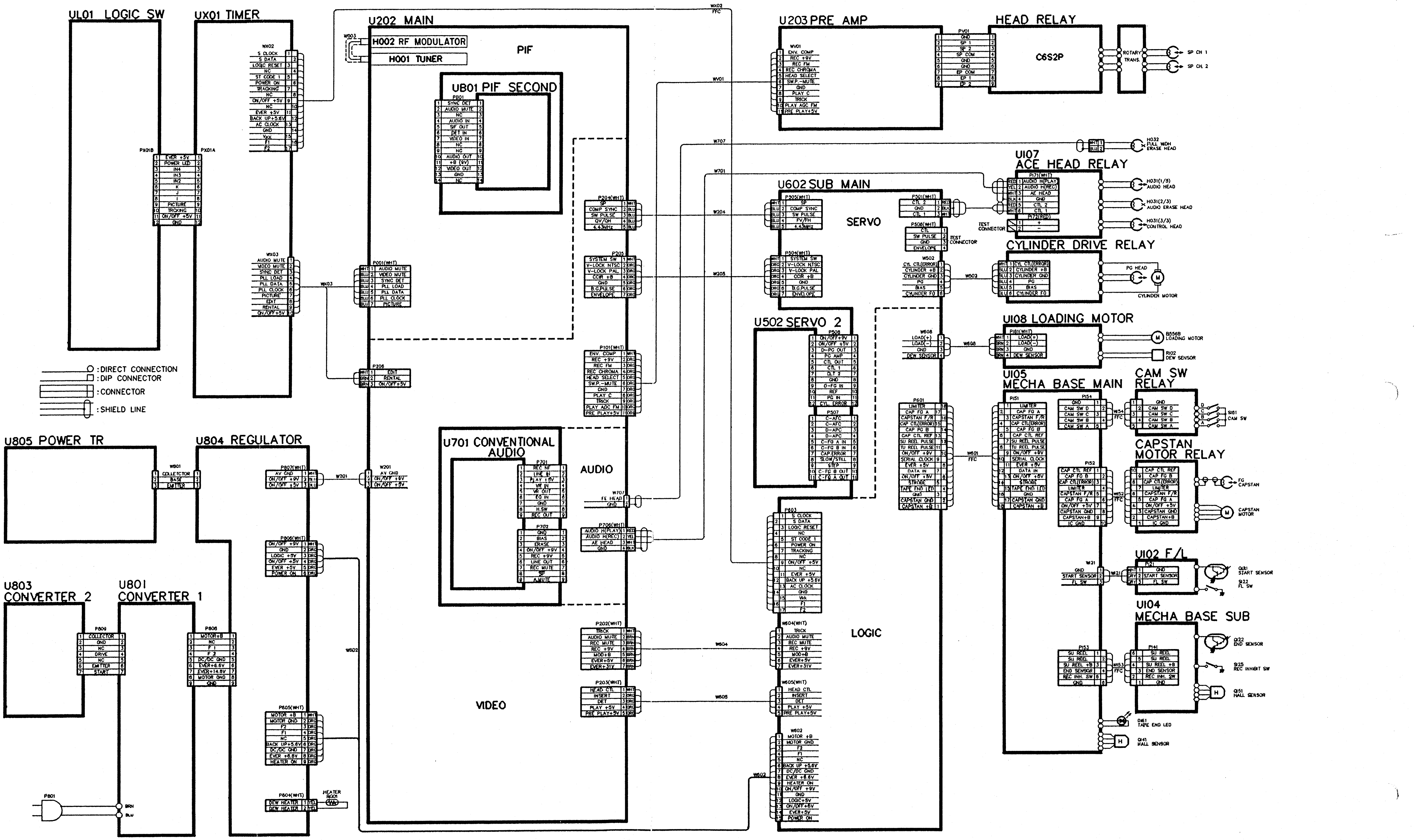
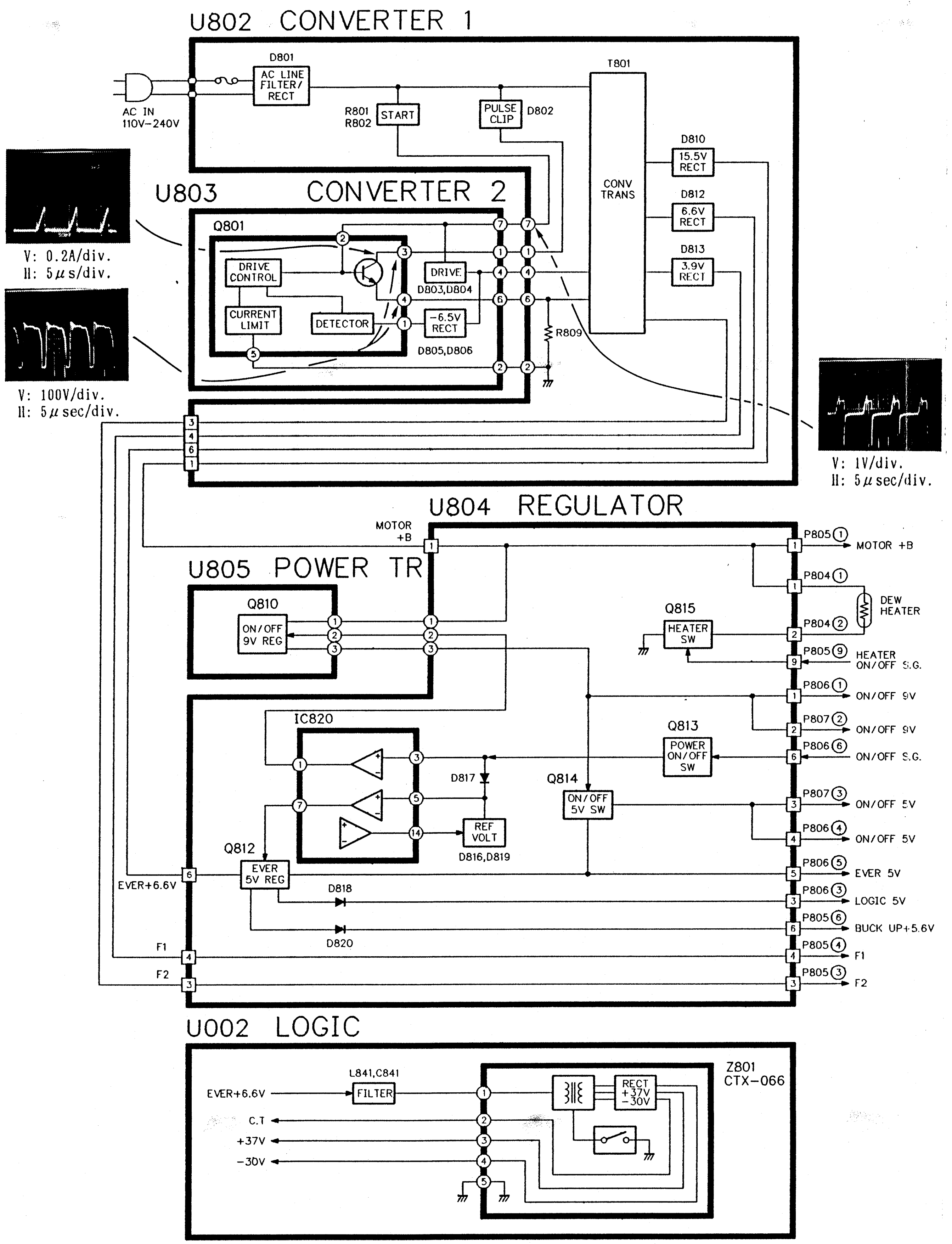


Fig. 8

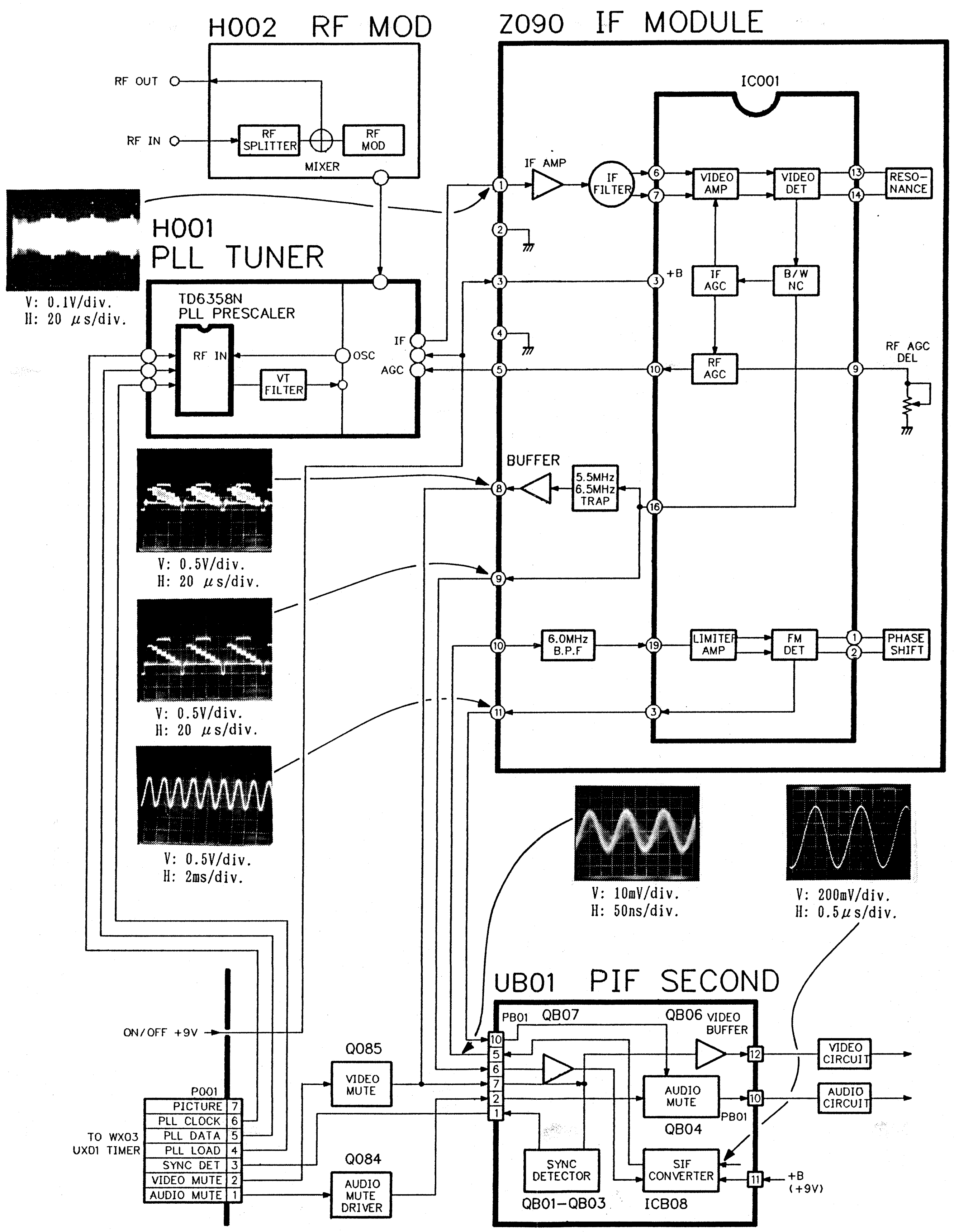
6. Printed Wiring Board and Schematic Diagram


UL01 LOGIC SW
UX01 TIMER
U202 MAIN
H002 RF MODULATOR
H001 TUNER
PIF
UB01 PIF SECOND
U203 PRE AMP
HEAD RELAY
C6S2P
ROTARY TRANS.
SP CH 1
SP CH 2
H032 FULL WIDTH ERASE HEAD
U107 ACE HEAD RELAY
H031(1/3) AUDIO HEAD
H031(2/3) AUDIO ERASE HEAD
H031(3/3) CONTROL HEAD
U602 SUB MAIN
SERVO
TEST CONNECTOR
CYLINDER DRIVE RELAY
PG HEAD
CYLINDER MOTOR
U502 SERVO 2
U108 LOADING MOTOR
B556B LOADING MOTOR
R102 DEW SENSOR
U105 MECHA BASE MAIN
CAM SW RELAY
S161 CAM SW
CAPSTAN MOTOR RELAY
FG CAPSTAN
CAPSTAN MOTOR
U102 F/L
Q121 START SENSOR
S122 FL SW
U104 MECHA BASE SUB
Q22 END SENSOR
S25 REC INHIBIT SW
Q51 HALL SENSOR
D161 TAPE END LED
Q141 HALL SENSOR
LOGIC
:DIRECT CONNECTION
:DIP CONNECTOR
:CONNECTOR
:SHIELD LINE
U805 POWER TR
U804 REGULATOR
U701 CONVENTIONAL AUDIO
AUDIO
VIDEO
U803 CONVERTER 2
U801 CONVERTER 1
P801
BRN
BLU
HEATER RG01

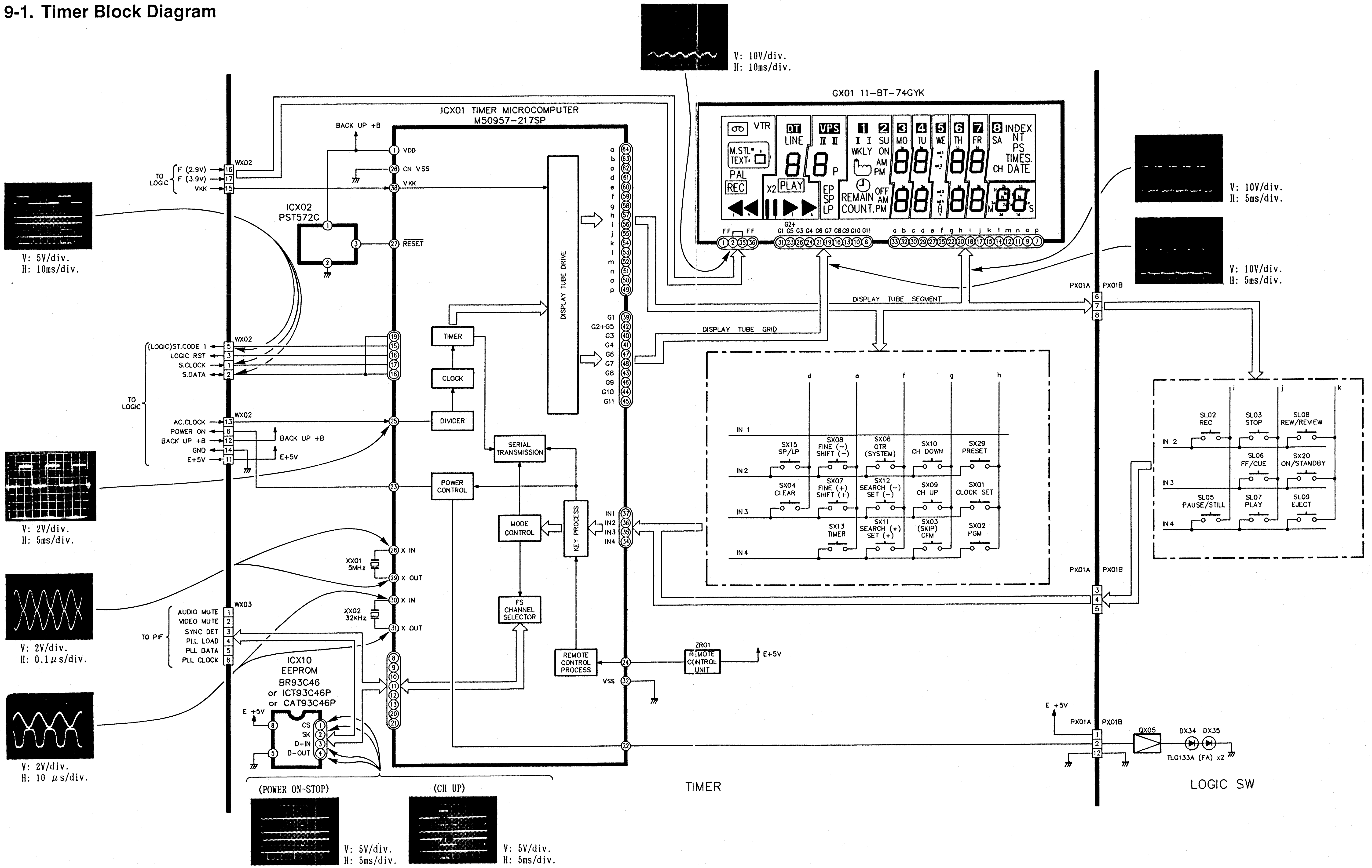
7-1. Power Supply Block Diagram


U802 CONVERTER 1
AC IN
110V-240V
D801
AC LINE FILTER/ RECT
R801
R802
START
PULSE CLIP
D802
T801
CONV TRANS
D810
15.5V RECT
D812
6.6V RECT
D813
3.9V RECT
U803 CONVERTER 2
Q801
DRIVE CONTROL
CURRENT LIMIT
DETECTOR
DRIVE
D803,D804
-6.5V RECT
D805,D806
R809
V: 0.2A/div.
H: 5μs/div.
V: 100V/div.
H: 5μsec/div.
V: 1V/div.
H: 5μsec/div.
U804 REGULATOR
MOTOR +B
U805 POWER TR
Q810
ON/OFF 9V REG
Q815
HEATER SW
IC820
D817
REF VOLT
D816,D819
Q814
ON/OFF 5V SW
Q813
POWER ON/OFF SW
Q812
EVER 5V REG
EVER+6.6V
D818
D820
F1
F2
P805① MOTOR +B
P804①
DEW HEATER
P804②
P805⑨ HEATER ON/OFF S.G.
P806① ON/OFF 9V
P807② ON/OFF 9V
P806⑥ ON/OFF S.G.
P807③ ON/OFF 5V
P806④ ON/OFF 5V
P806⑤ EVER 5V
P806③ LOGIC 5V
P805⑥ BUCK UP+5.6V
P805④ F1
P805③ F2
U002 LOGIC
L841,C841
FILTER
EVER+6.6V
C.T
+37V
-30V
Z801
CTX-066
RECT +37V -30V

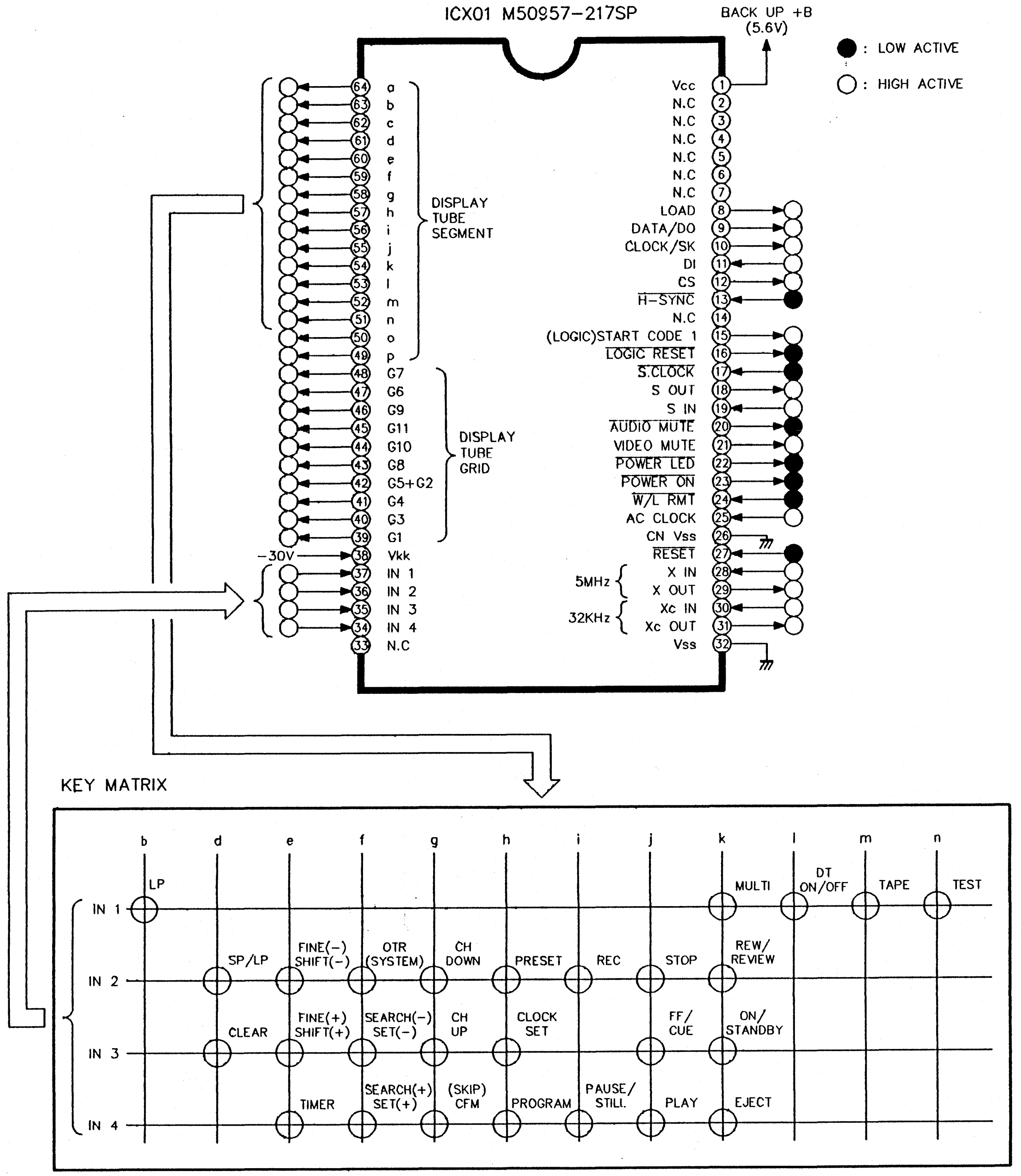
8-1. PIF Block Diagram


H002 RF MOD
RF OUT
RF IN
RF SPLITTER
MIXER
RF MOD
Z090 IF MODULE
IC001
IF AMP
IF FILTER
VIDEO AMP
VIDEO DET
RESO-NANCE
+B
IF AGC
B/W NC
RF AGC
RF AGC DEL
H001 PLL TUNER
TD6358N PLL PRESCALER
RF IN
VT FILTER
OSC
IF
AGC
V: 0.1V/div.
H: 20 μs/div.
BUFFER
5.5MHz 6.5MHz TRAP
V: 0.5V/div.
H: 20 μs/div.
V: 0.5V/div.
H: 20 μs/div.
V: 0.5V/div.
H: 2ms/div.
6.0MHz B.P.F
LIMITER AMP
FM DET
PHASE SHIFT
V: 10mV/div.
H: 50ns/div.
V: 200mV/div.
H: 0.5μs/div.
UB01 PIF SECOND
PB01
QB07
QB06 VIDEO BUFFER
VIDEO CIRCUIT
AUDIO CIRCUIT
AUDIO MUTE
QB04
SYNC DETECTOR
QB01-QB03
SIF CONVERTER
ICB08
+B (+9V)
ON/OFF +9V
Q085
VIDEO MUTE
Q084
AUDIO MUTE DRIVER
P001
PICTURE 7
PLL CLOCK 6
PLL DATA 5
PLL LOAD 4
SYNC DET 3
VIDEO MUTE 2
AUDIO MUTE 1
TO WX03
UX01 TIMER

9-1. Timer Block Diagram

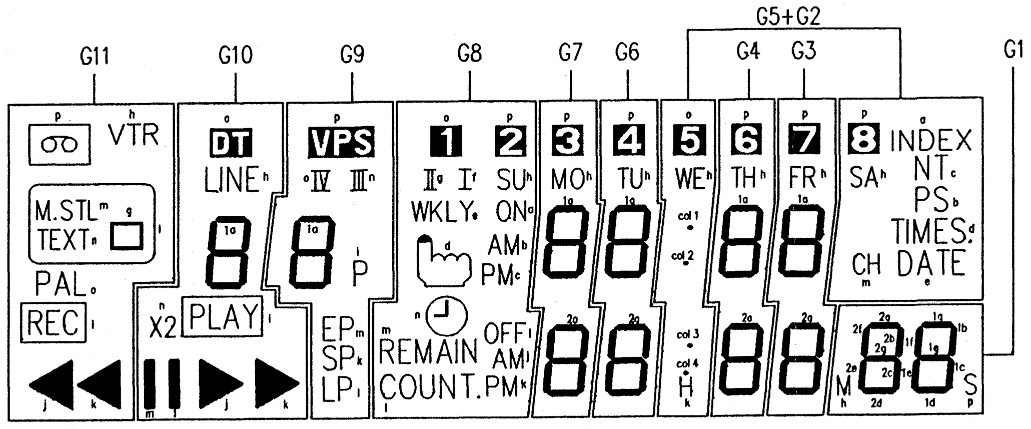

V: 10V/div.
H: 10ms/div.
GX01 11-BT-74GYK
ICX01 TIMER MICROCOMPUTER
M50957-217SP
BACK UP +B
VDD
CN VSS
VKK
RESET
ICX02
PST572C
TO LOGIC
F (2.9V)
F (3.9V)
VKK
WX02
V: 5V/div.
H: 10ms/div.
DISPLAY TUBE DRIVE
a b c d e f g h i j k l m n o p
G1 G2+G5 G3 G4 G6 G7 G8 G9 G10 G11
VTR
DT
LINE
VPS
M.STL
TEXT
PAL
REC
X2
PLAY
EP
SP
LP
REMAIN
COUNT.PM
WKLY
ON
AM
PM
OFF
SU MO TU WE TH FR SA
INDEX
NT
PS
TIMES.
CH DATE
V: 10V/div.
H: 5ms/div.
V: 10V/div.
H: 5ms/div.
DISPLAY TUBE SEGMENT
DISPLAY TUBE GRID
PX01A
PX01B
(LOGIC)ST.CODE 1
LOGIC RST
S.CLOCK
S.DATA
TIMER
CLOCK
DIVIDER
AC.CLOCK
POWER ON
BACK UP +B
GND
E+5V
SERIAL TRANSMISSION
POWER CONTROL
MODE CONTROL
KEY PROCESS
IN1 IN2 IN3 IN4
V: 2V/div.
H: 5ms/div.
XX01 5MHz
X IN
X OUT
XX02 32KHz
FS CHANNEL SELECTOR
WX03
TO PIF
AUDIO MUTE
VIDEO MUTE
SYNC DET
PLL LOAD
PLL DATA
PLL CLOCK
V: 2V/div.
H: 0.1µs/div.
ICX10
EEPROM
BR93C46
or ICT93C46P
or CAT93C46P
E +5V
CS
SK
D-IN
D-OUT
V: 2V/div.
H: 10 µs/div.
REMOTE CONTROL PROCESS
ZR01 REMOTE CONTROL UNIT
E+5V
VSS
SX15 SP/LP
SX08 FINE (−) SHIFT (−)
SX06 OTR (SYSTEM)
SX10 CH DOWN
SX29 PRESET
SX04 CLEAR
SX07 FINE (+) SHIFT (+)
SX12 SEARCH (−) SET (−)
SX09 CH UP
SX01 CLOCK SET
SX13 TIMER
SX11 SEARCH (+) SET (+)
SX03 (SKIP) CFM
SX02 PGM
SL02 REC
SL03 STOP
SL08 REW/REVIEW
SL06 FF/CUE
SX20 ON/STANDBY
SL05 PAUSE/STILL
SL07 PLAY
SL09 EJECT
QX05
DX34 DX35
TLG133A (FA) x2
(POWER ON-STOP)
(CH UP)
V: 5V/div.
H: 5ms/div.
V: 5V/div.
H: 5ms/div.
TIMER
LOGIC SW

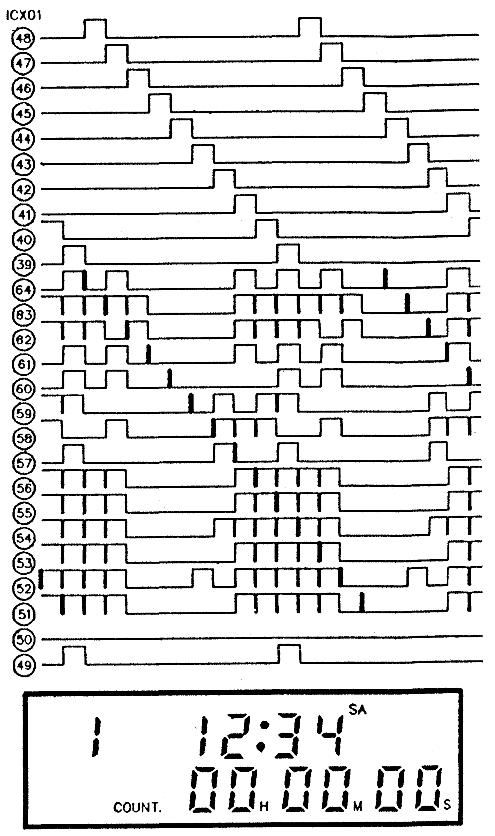
Timer Microcomputer Terminal Function


ICX01 M50957-217SP
BACK UP +B (5.6V)
● : LOW ACTIVE
○ : HIGH ACTIVE
Vcc
N.C
DATA/DO
CLOCK/SK
DI
CS
H-SYNC
(LOGIC)START CODE 1
LOGIC RESET
S.CLOCK
S OUT
S IN
AUDIO MUTE
VIDEO MUTE
POWER LED
POWER ON
W/L RMT
AC CLOCK
CN Vss
RESET
5MHz
X IN
X OUT
32KHz
Xc IN
Xc OUT
Vss
DISPLAY TUBE SEGMENT
DISPLAY TUBE GRID
G7
G6
G9
G11
G10
G8
G5+G2
G4
G3
G1
-30V
Vkk
IN 1
IN 2
IN 3
IN 4
N.C
KEY MATRIX
LP
MULTI
DT ON/OFF
TAPE
TEST
SP/LP
FINE(−) SHIFT(−)
OTR (SYSTEM)
CH DOWN
PRESET
REC
STOP
REW/ REVIEW
CLEAR
FINE(+) SHIFT(+)
SEARCH(−) SET(−)
CH UP
CLOCK SET
FF/ CUE
ON/ STANDBY
TIMER
SEARCH(+) SET(+)
(SKIP) CFM
PROGRAM
PAUSE/ STILL
PLAY
EJECT

Timer Display

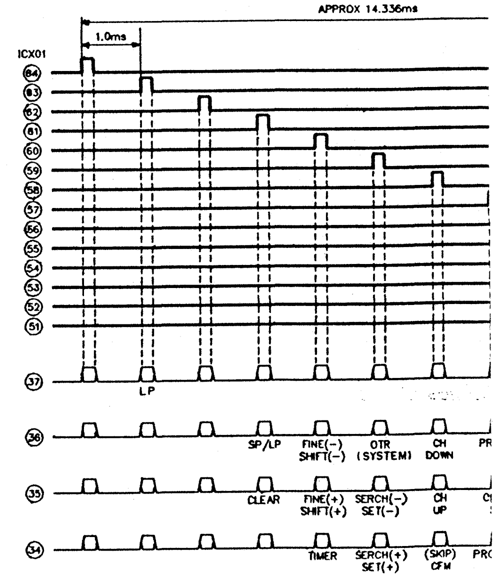
GX01 11-BT-74GYK


G11
G10
G9
G8
G7
G6
G5+G2
G4
G3
G1
VTR
DT
LINE
VPS
M.STL
TEXT
PAL
REC
X2
PLAY
WKLY
SU
ON
AM
PM
EP
SP
LP
REMAIN
COUNT.
OFF
MO
TU
WE
TH
FR
SA
INDEX
NT
PS
TIMES
CH
DATE
M
H
S

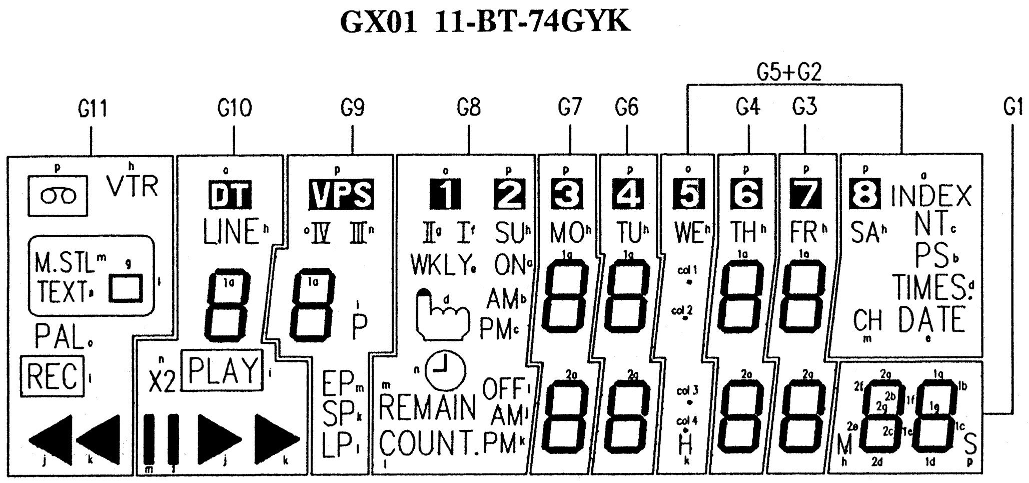

ICX01
SA
1 12:34
COUNT.
00H 00M 00S

Timer Display Pattern

	G11	G10	G9	G8	G7	G6	G4	G3	G2+G5	G1
a		1a	1a	ON	1a	1a	1a	1a	INDEX	1a
b		1b	1b	AM(UPPER)	1b	1b	1b	1b	PS	1b
c		1c	1c	PM(UPPER)	1c	1c	1c	1c	NT	1c
d		1d	1d	☞	1d	1d	1d	1d	TIME S.	1d
e		1e	1e	WKLY	1e	1e	1e	1e	DATE	1e
f		1f	1f	I	1f	1f	1f	1f	●○(UPPER)	1f
g	▭	1g	1g	II	1g	1g	1g	1g	○●(UPPER)	1g
h	VTR	LINE		SU	MO	TU	TH	FR	SA	M
i	REC	PLAY	P	OFF	2a	2a	2a	2a	●○(LOWER)	2a
j	◀◁	▶▷		AM(LOWER)	2b	2b	2b	2b	○●(LOWER)	2b
k	◁◀	▷▶	SP	PM(LOWER)	2c	2c	2c	2c	H	2c
l	▭	▯▮	LP	COUNT.	2d	2d	2d	2d		2d
m	M.STL	▮▯	EP	REMAIN	2e	2e	2e	2e	CH	2e
n	TEXT	X2	III	🕘	2f	2f	2f	2f	WE	2f
o	PAL	DT	IV	1	2g	2g	2g	2g	5	2g
p	OO		VPS	2	3	4	6	7	8	S

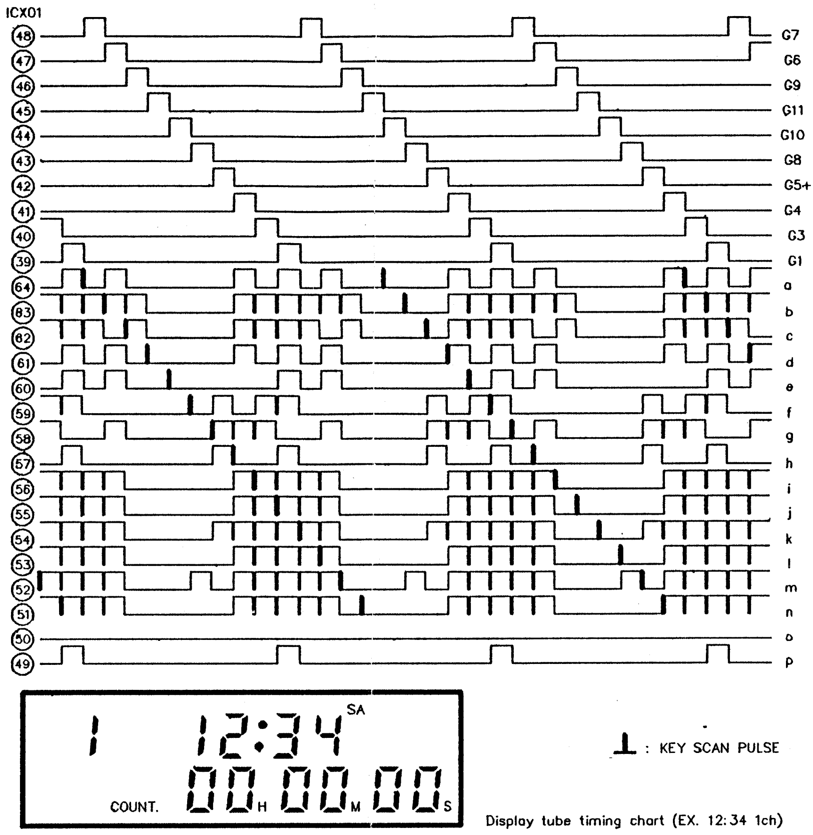

APPROX 14.336ms
ICX01
1.0ms
LP
SP/LP
FINE(−) SHIFT(−)
OTR (SYSTEM)
CH DOWN
CLEAR
FINE(+) SHIFT(+)
SERCH(−) SET(−)
CH UP
TIMER
SERCH(+) SET(+)
(SKIP) CFM

Timer Display

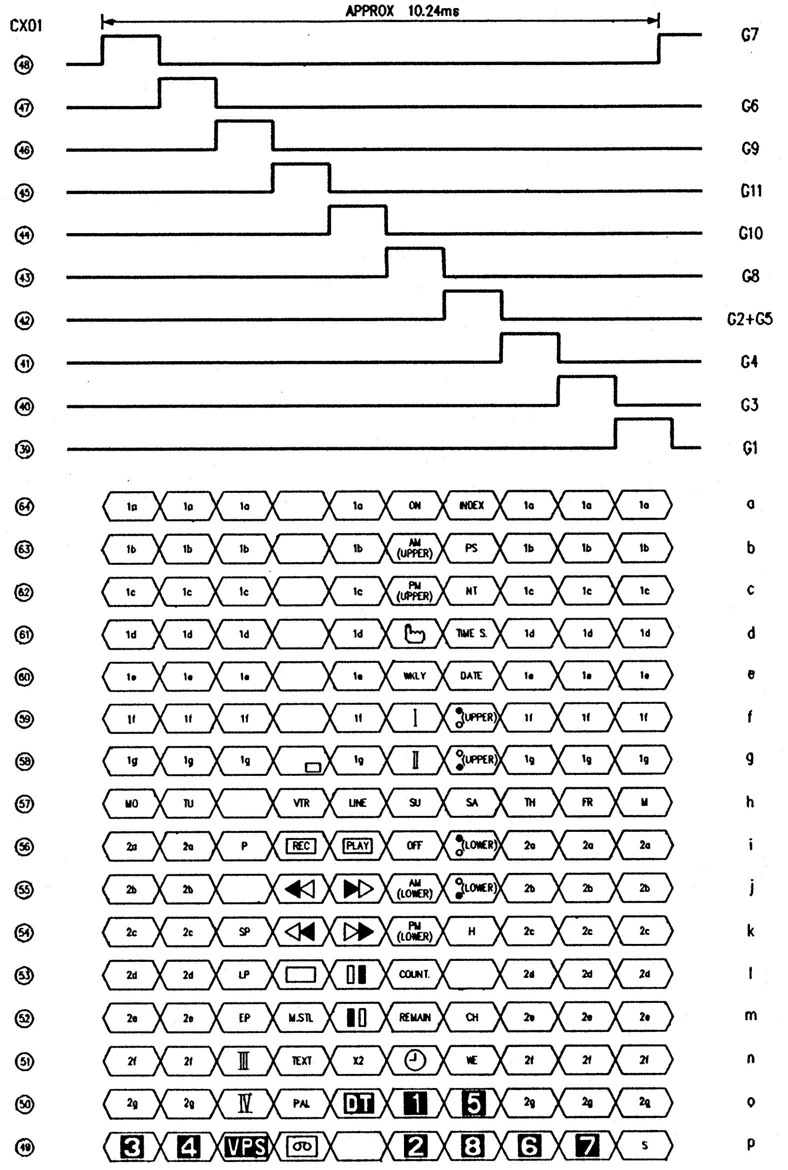

GX01 11-BT-74GYK
G11
G10
G9
G8
G7
G6
G5+G2
G4
G3
G1
VTR
M.STL
TEXT
PAL
REC
DT
LINE
X2
PLAY
VPS
P
EP
SP
LP
WKLY
SU
ON
AM
PM
REMAIN
COUNT.
OFF
MO
TU
WE
TH
FR
SA
INDEX
NT
PS
TIMES
CH
DATE
H
M
S

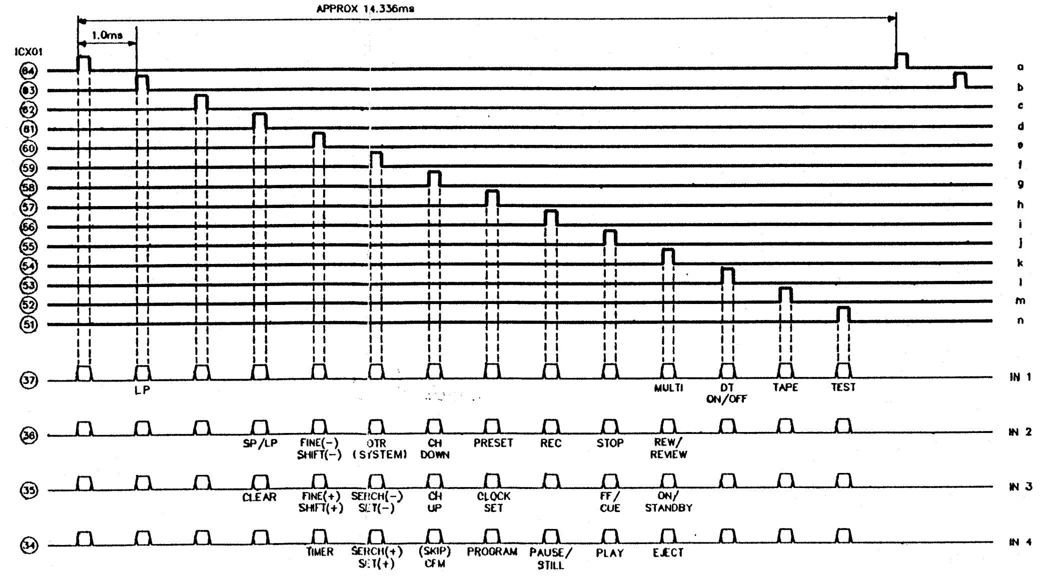
Timer Display Pattern

	G11	G10	G9	G8	G7	G6	G4	G3	G2+G5	G1
a		1a	1a	ON	1a	1a	1a	1a	INDEX	1a
b		1b	1b	AM(UPPER)	1b	1b	1b	1b	PS	1b
c		1c	1c	PM(UPPER)	1c	1c	1c	1c	NT	1c
d		1d	1d	☝	1d	1d	1d	1d	TIME S.	1d
e		1e	1e	WKLY	1e	1e	1e	1e	DATE	1e
f		1f	1f	Ⅰ	1f	1f	1f	1f	●○(UPPER)	1f
g	▭	1g	1g	Ⅱ	1g	1g	1g	1g	○●(UPPER)	1g
h	VTR	LINE		SU	MO	TU	TH	FR	SA	M
i	REC	PLAY	P	OFF	2a	2a	2a	2a	●○(LOWER)	2a
j	◀◁	▶▷		AM(LOWER)	2b	2b	2b	2b	○●(LOWER)	2b
k	◁◀	▷▶	SP	PM(LOWER)	2c	2c	2c	2c	H	2c
l	▭	▯▮	LP	COUNT.	2d	2d	2d	2d		2d
m	M.STL	▮▯	EP	REMAIN	2e	2e	2e	2e	CH	2e
n	TEXT	X2	Ⅲ	🕘	2f	2f	2f	2f	WE	2f
o	PAL	DT	Ⅳ	1	2g	2g	2g	2g	5	2g
p	oo		VPS	2	3	4	6	7	8	S


ICX01
G7
G6
G9
G11
G10
G8
G5+G2
G4
G3
G1
a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p
SA
COUNT.
H
M
S
⊥ : KEY SCAN PULSE

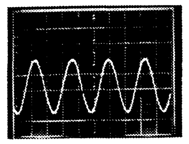
Display tube timing chart (EX. 12:34 1ch)


CX01
APPROX 10.24ms
G7
G6
G9
G11
G10
G8
G2+G5
G4
G3
G1
a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p


APPROX 14.336ms
1.0ms
ICX01
IN 1
IN 2
IN 3
IN 4
LP
MULTI
DT ON/OFF
TAPE
TEST
SP/LP
FINE(−) SHIFT(−)
OTR (SYSTEM)
CH DOWN
PRESET
REC
STOP
REW/ REVIEW
CLEAR
FINE(+) SHIFT(+)
SERCH(−) SET(−)
CH UP
CLOCK SET
FF/ CUE
ON/ STANDBY
TIMER
SERCH(+) SET(+)
(SKIP) CFM
PROGRAM
PAUSE/ STILL
PLAY
EJECT

10-1. Logic Block Diagram

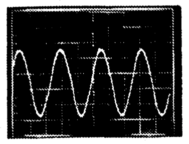
① IC601, Pin ㊿
IC602, Pin ㊿



(EE)

V: 1V/div.
H: 50 μs/div.

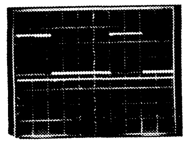
② IC601, Pin (51)
IC602, Pin (51)



(EE)

V: 1V/div.
H: 0.1μs/div.

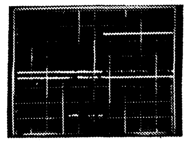
③ a: IC601, Pin ㊽
b: IC601, Pin ㊿



(EE)

V: 1V/div.
H: 50 μs/div.

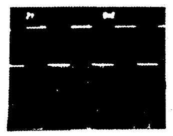
④ a: IC601, Pin ③
b: IC601, Pin ④



(EE)

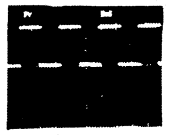
V: 2V/div.
H: 0.5ms/div.

⑤ IC601, Pin (54)

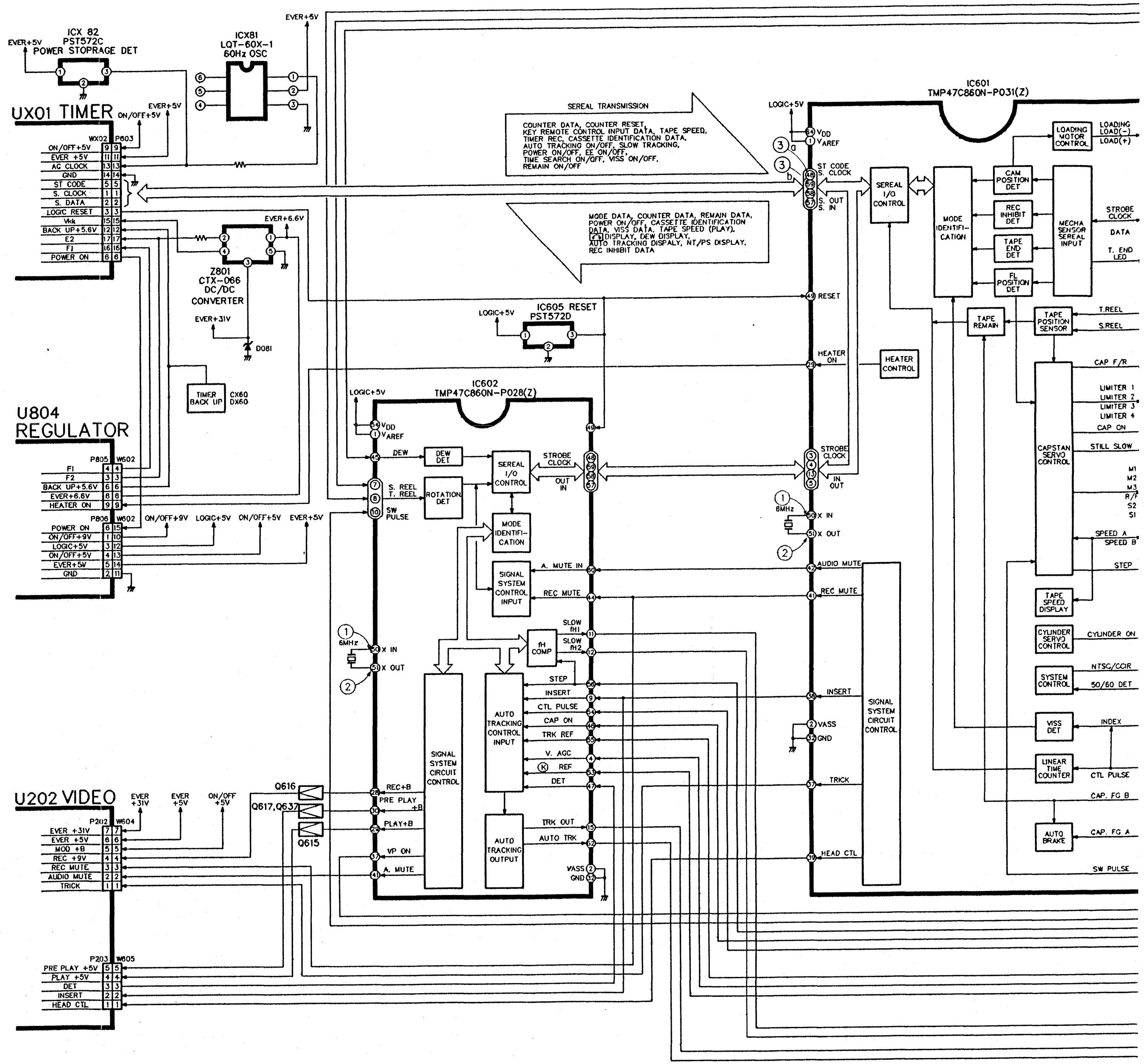


V: 2V/div.
H: 5ms/div.

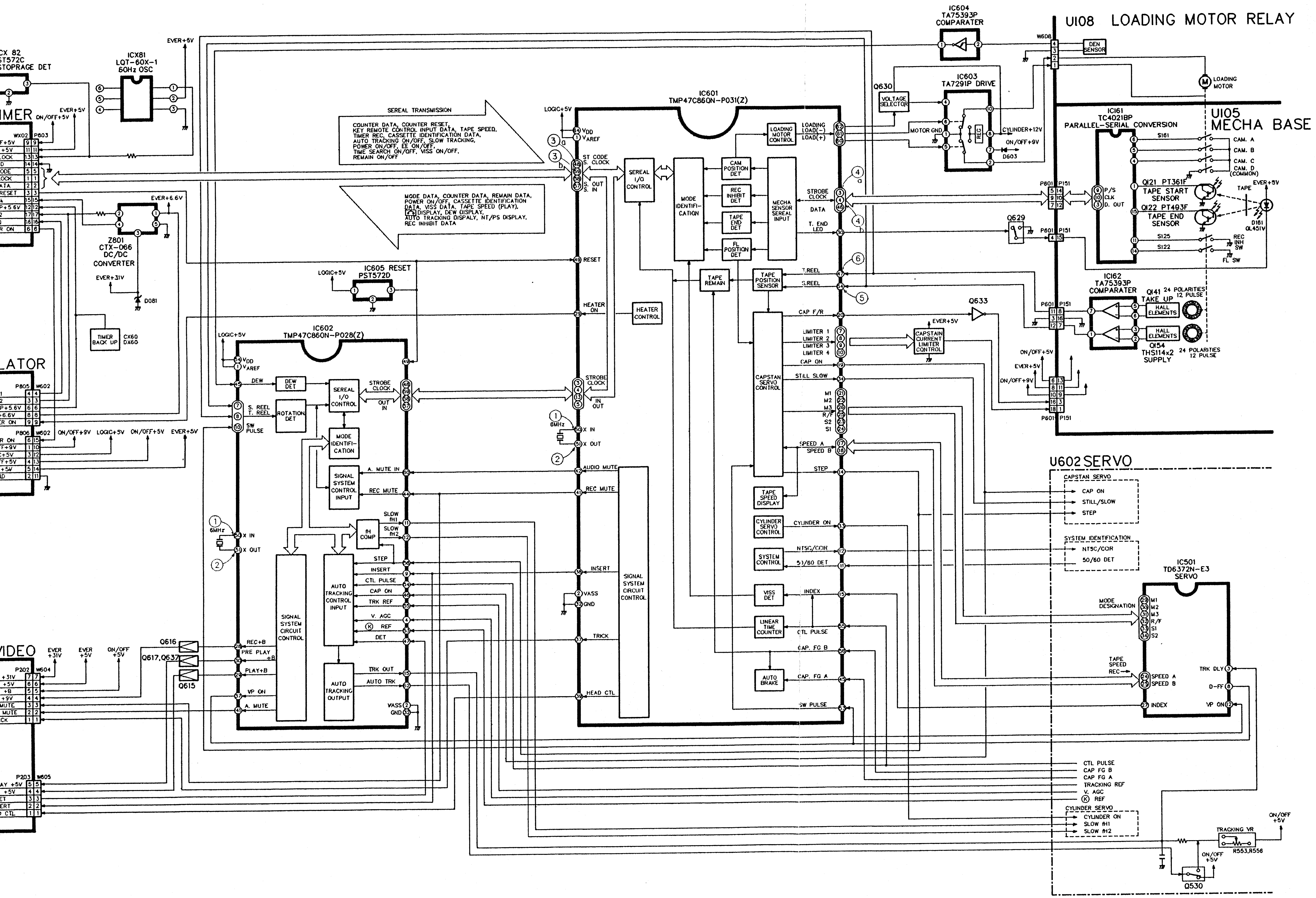
⑥ IC601, Pin ㊼



V: 2V/div.
H: 5ms/div.

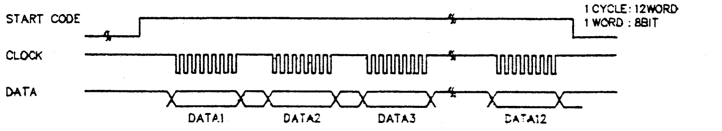


ICX 82
PST572C
POWER STOPRAGE DET
EVER+5V
ICX81
LQT-60X-1
60Hz OSC
EVER+5V
UX01 TIMER
ON/OFF+5V
WX02
P803
ON/OFF+5V
EVER +5V
AC CLOCK
GND
ST CODE
S. CLOCK
S. DATA
LOGIC RESET
Vkk
BACK UP+5.6V
E2
F1
POWER ON
EVER+6.6V
Z801
CTX-066
DC/DC
CONVERTER
EVER+31V
D081
TIMER BACK UP
CX60
DX60
U804
REGULATOR
P805
W602
F1
F2
BACK UP+5.6V
EVER+6.6V
HEATER ON
P806
POWER ON
ON/OFF+9V
LOGIC+5V
ON/OFF+5V
EVER+5V
GND
ON/OFF+9V
LOGIC+5V
ON/OFF+5V
EVER+5V
SEREAL TRANSMISSION
COUNTER DATA, COUNTER RESET,
KEY REMOTE CONTROL INPUT DATA, TAPE SPEED,
TIMER REC, CASSETTE IDENTIFICATION DATA,
AUTO TRACKING ON/OFF, SLOW TRACKING,
POWER ON/OFF, EE ON/OFF,
TIME SEARCH ON/OFF, VISS ON/OFF,
REMAIN ON/OFF
MODE DATA, COUNTER DATA, REMAIN DATA,
POWER ON/OFF, CASSETTE IDENTIFICATION
DATA, VISS DATA, TAPE SPEED (PLAY),
DISPLAY, DEW DISPLAY,
AUTO TRACKING DISPLAY, NT/PS DISPLAY,
REC INHIBIT DATA
LOGIC+5V
IC605 RESET
PST572D
IC602
TMP47C860N-P028(Z)
VDD
VAREF
DEW
DEW DET
S. REEL
T. REEL
ROTATION DET
SW PULSE
SEREAL I/O CONTROL
STROBE
CLOCK
OUT
IN
MODE IDENTIFI-CATION
SIGNAL SYSTEM CONTROL INPUT
A. MUTE IN
REC MUTE
SLOW fH1
SLOW fH2
fH COMP
6MHz
X IN
X OUT
STEP
INSERT
CTL PULSE
CAP ON
TRK REF
V. AGC
REF
DET
SIGNAL SYSTEM CIRCUIT CONTROL
AUTO TRACKING CONTROL INPUT
AUTO TRACKING OUTPUT
TRK OUT
AUTO TRK
VASS
GND
U202 VIDEO
EVER +31V
EVER +5V
ON/OFF +5V
Q616
Q617,Q637
Q615
REC+B
PRE PLAY +B
PLAY+B
VP ON
A. MUTE
P202
W604
EVER +31V
EVER +5V
MOD +B
REC +9V
REC MUTE
AUDIO MUTE
TRICK
P203
W605
PRE PLAY +5V
PLAY +5V
DET
INSERT
HEAD CTL
IC601
TMP47C860N-P031(Z)
LOGIC+5V
VDD
VAREF
ST CODE
S. CLOCK
S. OUT
S. IN
SEREAL I/O CONTROL
MODE IDENTIFI-CATION
RESET
HEATER ON
HEATER CONTROL
STROBE
CLOCK
IN
OUT
8MHz
X IN
X OUT
AUDIO MUTE
REC MUTE
INSERT
VASS
GND
TRICK
HEAD CTL
SIGNAL SYSTEM CIRCUIT CONTROL
LOADING MOTOR CONTROL
LOADING
LOAD(-)
LOAD(+)
CAM POSITION DET
REC INHIBIT DET
TAPE END DET
FL POSITION DET
MECHA SENSOR SEREAL INPUT
STROBE
CLOCK
DATA
T. END
LED
TAPE REMAIN
TAPE POSITION SENSOR
T.REEL
S.REEL
CAP F/R
LIMITER 1
LIMITER 2
LIMITER 3
LIMITER 4
CAP ON
STILL SLOW
CAPSTAN SERVO CONTROL
M1
M2
M3
R/F
S2
S1
SPEED A
SPEED B
STEP
TAPE SPEED DISPLAY
CYLINDER SERVO CONTROL
CYLINDER ON
NTSC/CCIR
SYSTEM CONTROL
50/60 DET
VISS DET
INDEX
LINEAR TIME COUNTER
CTL PULSE
CAP. FG B
AUTO BRAKE
CAP. FG A
SW PULSE


U108 LOADING MOTOR RELAY
U105 MECHA BASE
U602 SERVO
IC601 TMP47C860N-P031(Z)
IC602 TMP47C860N-P028(Z)
IC604 TA75393P COMPARATER
IC603 TA7291P DRIVE
IC605 RESET PST572D
IC161 TC4021BP PARALLEL-SERIAL CONVERSION
IC162 TA75393P COMPARATER
IC501 TD6372N-E3 SERVO
ICX81 LQT-60X-1 60Hz OSC
Z801 CTX-066 DC/DC CONVERTER
SEREAL TRANSMISSION
COUNTER DATA, COUNTER RESET, KEY REMOTE CONTROL INPUT DATA, TAPE SPEED, TIMER REC, CASSETTE IDENTIFICATION DATA, AUTO TRACKING ON/OFF, SLOW TRACKING, POWER ON/OFF, EE ON/OFF, TIME SEARCH ON/OFF, VISS ON/OFF, REMAIN ON/OFF
MODE DATA, COUNTER DATA, REMAIN DATA, POWER ON/OFF, CASSETTE IDENTIFICATION DATA, VISS DATA, TAPE SPEED (PLAY), DISPLAY, DEW DISPLAY, AUTO TRACKING DISPALY, NT/PS DISPLAY, REC INHIBIT DATA
SEREAL I/O CONTROL
MODE IDENTIFI-CATION
CAM POSITION DET
REC INHIBIT DET
TAPE END DET
FL POSITION DET
MECHA SENSOR SEREAL INPUT
LOADING MOTOR CONTROL
TAPE REMAIN
TAPE POSITION SENSOR
HEATER CONTROL
CAPSTAN SERVO CONTROL
TAPE SPEED DISPLAY
CYLINDER SERVO CONTROL
SYSTEM CONTROL
VISS DET
LINEAR TIME COUNTER
AUTO BRAKE
SIGNAL SYSTEM CIRCUIT CONTROL
DEW DET
ROTATION DET
SIGNAL SYSTEM CONTROL INPUT
fH COMP
AUTO TRACKING CONTROL INPUT
AUTO TRACKING OUTPUT
VOLTAGE SELECTOR
CAPSTAN CURRENT LIMITER CONTROL
DEN SENSOR
LOADING MOTOR
TAPE START SENSOR
TAPE END SENSOR
Q121 PT361F
Q122 PT493F
D161 GL451V
CAM. A
CAM. B
CAM. C
CAM. D (COMMON)
REC INH SW
FL SW
Q141 TAKE UP
Q154 THS114x2 SUPPLY
HALL ELEMENTS
24 POLARITIES 12 PULSE
TIMER BACK UP
CX60 DX60
Q630
Q629
Q633
Q616
Q617,Q637
Q615
Q530
TRACKING VR R553,R556
CAPSTAN SERVO
CAP ON
STILL/SLOW
STEP
SYSTEM IDENTIFICATION
NTSC/CCIR
50/60 DET
CYLINDER SERVO
CYLINDER ON
SLOW fH1
SLOW fH2
CTL PULSE
CAP FG B
CAP FG A
TRACKING REF
V. AGC
Ⓚ REF
MODE DESIGNATION
TAPE SPEED REC
SPEED A
SPEED B
INDEX
TRK DLY
D-FF
VP ON
LOGIC+5V
EVER+5V
EVER+6.6V
EVER+31V
ON/OFF+5V
ON/OFF+9V
CYLINDER+12V
MOTOR GND
D603
D081
6MHz
8MHz
ST CODE S. CLOCK
S. OUT S. IN
STROBE CLOCK
DATA
T. END LED
T.REEL
S.REEL
CAP F/R
LIMITER 1
LIMITER 2
LIMITER 3
LIMITER 4
STILL SLOW
M1 M2 M3 R/F S2 S1
SPEED A SPEED B
STEP
CYLINDER ON
NTSC/CCIR
50/60 DET
INDEX
CTL PULSE
CAP. FG B
CAP. FG A
SW PULSE
RESET
HEATER ON
AUDIO MUTE
REC MUTE
INSERT
VASS GND
TRICK
HEAD CTL
X IN
X OUT
DEW
S. REEL T. REEL
SW PULSE
A. MUTE IN
REC MUTE
SLOW fH1
SLOW fH2
STEP
INSERT
CTL PULSE
CAP ON
TRK REF
V. AGC
Ⓚ REF
DET
TRK OUT
AUTO TRK
REC+B
PRE PLAY +B
PLAY+B
VP ON
A. MUTE
P805 W602
P806 W602
P202 W604
P203 W605
WX02 P803
P801 P151
P601 P151
W608
ICX 82 PST572C STOPRAGE DET
TIMER
LATOR
VIDEO

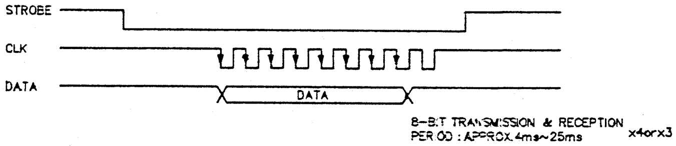
Serial Transmission

① ICX01(TIMER) ←→ IC601(LOGIC MAIN)


PERIOD : APPROX.60ms
1 CYCLE: 12WORD
1 WORD : 8BIT
START CODE
CLOCK
DATA
DATA1
DATA2
DATA3
DATA12

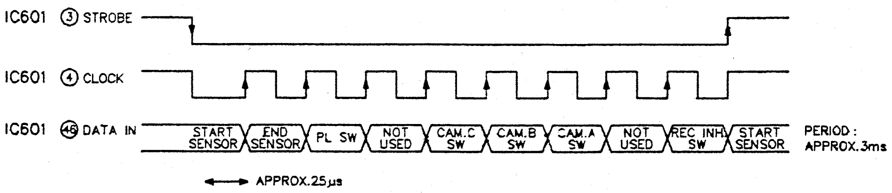
DIRECTION	CONTENTS	DATA
TIMER → LOGIC	• POWER ON/OFF • TAPE SPEED (REC) • E240/E180 SELECTION • TIME SEARCH • REMAIN ON/OFF • COUNTER RESET INPUT	DATA1
	• KEY INPUT DATA • COUNTER SYMBOL BACK UP • TV/VTR SELECTION	DATA3
	• LINEAR TIME COUNTER BACK UP, CASSETTE DISTINCTION BACK UP • SLOW TRACKING DATA • VISS SEARCH DATA • TIME SEARCH COUNTER DATA • TIME SEARCH MODE • VISS MODE INPUT	DATA5,7,9
	• LINE ON/OFF • EE ON/OFF • AUTO TRACKING ON/OFF	DATA11
LOGIC → TIMER	• ▭ DISPLAY DATA, TAPE SPEED (PLAY) • REC INHIBIT • AUTO TRACKING AND DEW DISPLAY, COUNTER SYMBOL	DATA2
	• MODE DISPLAY DATA • REMAIN DISPLAY SELECTION • PLAY +B • POWER ON/OFF	DATA4
	• LINEAR TIME COUNTER DATA • TAPE REMAIN DATA • VISS DATA • VISS MODE	DATA6,8,10
	• NTSC/CCIR	DATA12

② IC601(LOGIC MAIN) ←→ IC602(LOGIC SUB)


STROBE
CLK
DATA
DATA
8-BIT TRANSMISSION & RECEPTION
PERIOD : APPROX.4ms~25ms
x4orx3

DIRECTION	CONTENTS	DATA
IC601 → IC602	• MODE DATA • TV/VTR	1
	• POWER LED • SERVO LOCK DETECTION (PLAY, REC) • MECHA POSITION DETECTION • TAPE SPEED • QUICK REMAIN • NTSC/CCIR	2
	• AUTO TRACKING ON/OFF • EE-SW ON/OFF • CYLINDER ON/OFF • UNLOADING DETECTION	3
	• SLOW TRACKING DATA (MANUAL)	4
IC602 → IC601	• MODE AUTOMATIC RELEASE DETECTION • REEL CYLINDER ROTATION DETECTION • DEW	1
	• AUTO TRACKING DISPLAY DATA • PLAY +B ON/OFF	2
	• SLOW TRACKING DATA (AUTO)	3

③ IC601(LOGIC MAIN) ←→ IC161(MECHA PARALLEL-SERIAL CONVERSION)


IC601 ③ STROBE
IC601 ④ CLOCK
IC601 ㊻ DATA IN
START SENSOR
END SENSOR
PL SW
NOT USED
CAM.C SW
CAM.B SW
CAM.A SW
NOT USED
REC INH SW
START SENSOR
PERIOD : APPROX.3ms
APPROX.25μs

Logic Mode Shift Table

SW INPUT CURRENT MODE	EJECT	STOP	F F	REW	PLAY	×2	PAUSE /STILL	SLOW 1/6	SLOW 1/12	REC		TIMER REC	TAPE RETURN	TIME SEARCH		POWER
SLOT IN	○	○	△	△	△	△	×	×	×	×		×	—	—		POWER OFF
SLOT OUT	—	×	×	×	×	×	×	×	×	×		×	×	×		POWER OFF
STOP	○	—	○	○	○	○	×	×	×	○		○	○	○		POWER OFF
FF	○	○	CUE ✱	○	○	○	×	×	×	×		○	×	×		POWER OFF
REW	○	○	○	REVIEW ✱	○	○	×	×	×	×		○	×	×		POWER OFF
CUE	○	○	○	REVIEW ✱	○	○	×	×	×	×		○	×	×		POWER OFF
REVIEW	○	○	CUE ✱	○	○	○	×	×	×	×		○	×	×		POWER OFF
PLAY	○	○	CUE ✱	REVIEW ✱	—	○	STILL	○	○	×		○	×	○		POWER OFF
STILL	○	○	CUE ✱	REVIEW ✱	○ NOTE 1	○	PLAY	○	○	REC PAUSE		○	×	×		POWER OFF
SLOW 1/6	○	○	CUE ✱	REVIEW ✱	○	○	STILL	—	○	×		○	×	×		POWER OFF
SLOW 1/12	○	○	CUE ✱	REVIEW ✱	○	○	STILL	○	—	×		○	×	×		POWER OFF
×2	○	○	CUE ✱	REVIEW ✱	○	—	STILL	○	○	×		○	×	×		POWER OFF
REC	×	○	×	×	×	×	REC PAUSE	×	×	—		○	×	×		POWER OFF
REC PAUSE	×	○	×	×	×	×	REC	×	×	×		○	×	×		POWER OFF
TIMER REC	×	×	×	×	×	×	×	×	×	×		POWER OFF	×	×		POWER ON
POWER OFF	×	×	×	×	×	×	×	×	×	×		○	×	×		POWER ON

NOTE 1 : FRAME (1/25 SLOW MODE WHEN BUTTON IS KEPT PUSHING)

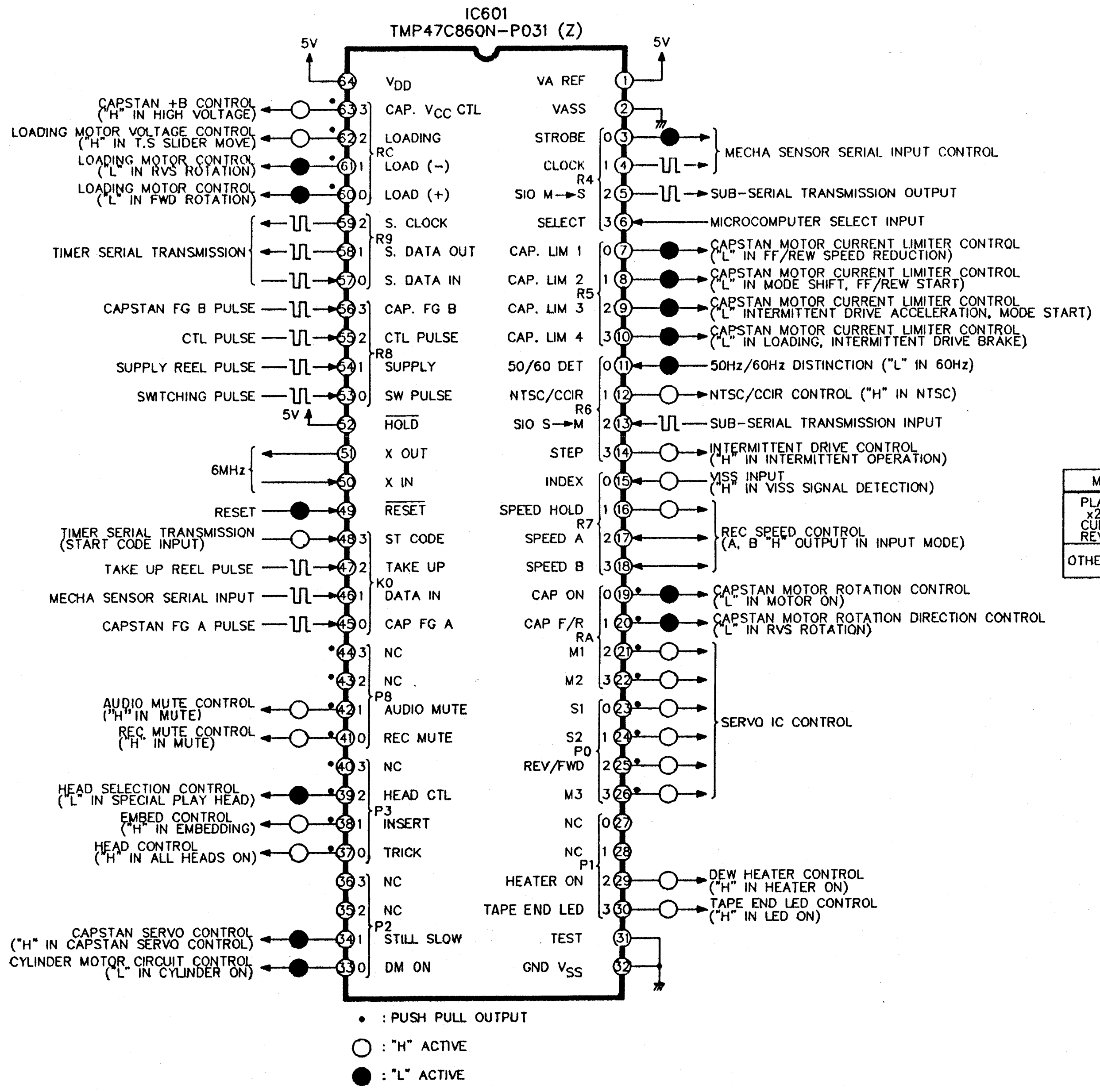
○ · · · SHIFTS TO INPUT MODE DIRECTORY.

△ · · · SHIFTS TO INPUT MODE AFTER SLOT IN IS COMPLETED.

× · · · NO SHIFT. (SAME MODE)

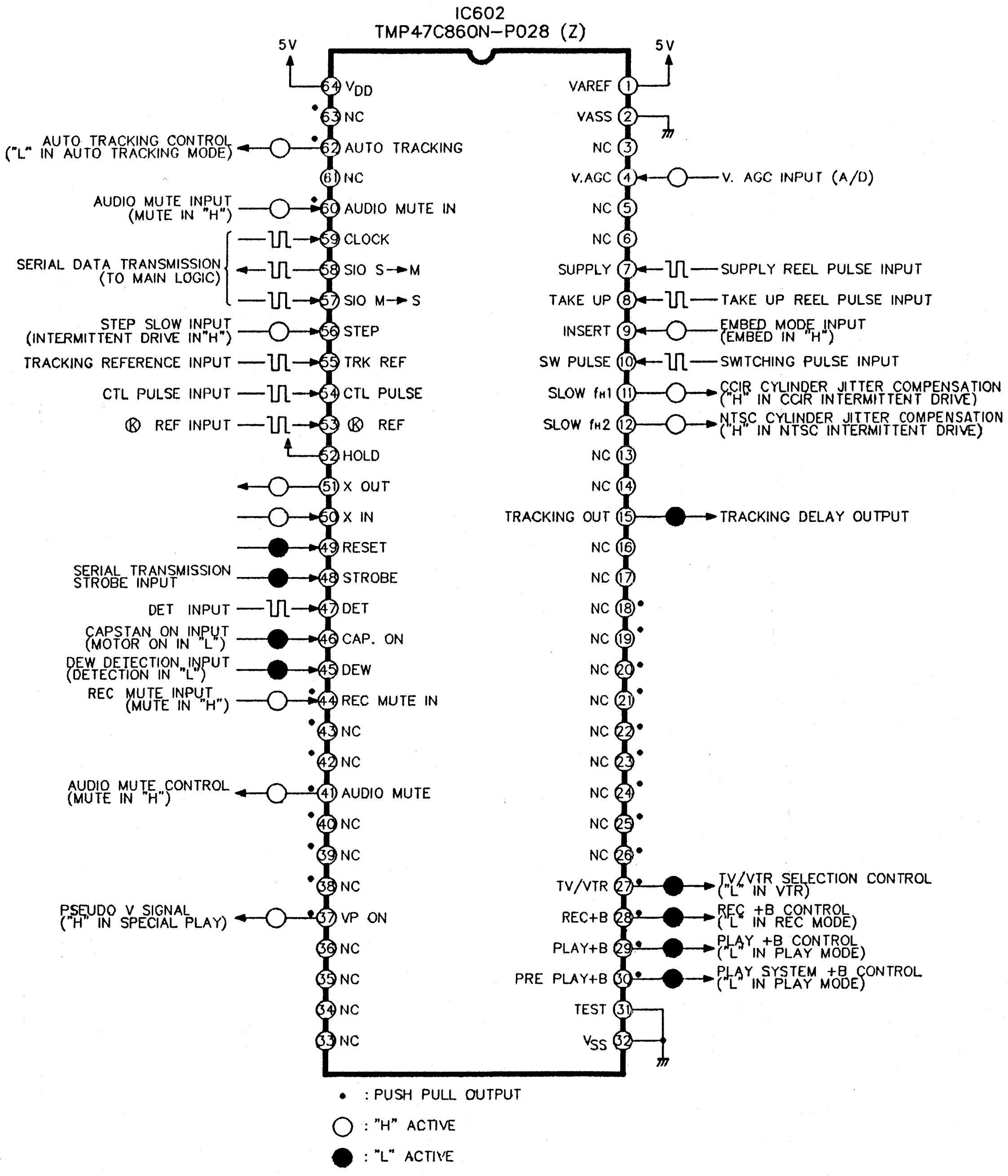
✱ · · · PAL : ×7 MODE,
NTSC : ×5 MODE

Logic Main Microcomputer Terminal Function


IC601
TMP47C860N–P031 (Z)
5V
5V
VDD
VA REF
VASS
CAP. VCC CTL
LOADING
STROBE
LOAD (–)
CLOCK
LOAD (+)
SIO M→S
S. CLOCK
SELECT
S. DATA OUT
CAP. LIM 1
S. DATA IN
CAP. LIM 2
CAP. FG B
CAP. LIM 3
CTL PULSE
CAP. LIM 4
SUPPLY
50/60 DET
SW PULSE
NTSC/CCIR
HOLD
SIO S→M
X OUT
STEP
X IN
INDEX
RESET
SPEED HOLD
ST CODE
SPEED A
TAKE UP
SPEED B
DATA IN
CAP ON
CAP FG A
CAP F/R
NC
M1
NC
M2
AUDIO MUTE
S1
REC MUTE
S2
NC
REV/FWD
HEAD CTL
M3
INSERT
NC
TRICK
NC
NC
HEATER ON
NC
TAPE END LED
STILL SLOW
TEST
DM ON
GND VSS
RC
R9
R8
K0
P8
P3
P2
R4
R5
R6
R7
RA
P0
P1
CAPSTAN +B CONTROL ("H" IN HIGH VOLTAGE)
LOADING MOTOR VOLTAGE CONTROL ("H" IN T.S SLIDER MOVE)
LOADING MOTOR CONTROL ("L" IN RVS ROTATION)
LOADING MOTOR CONTROL ("L" IN FWD ROTATION)
TIMER SERIAL TRANSMISSION
CAPSTAN FG B PULSE
CTL PULSE
SUPPLY REEL PULSE
SWITCHING PULSE
5V
6MHz
RESET
TIMER SERIAL TRANSMISSION (START CODE INPUT)
TAKE UP REEL PULSE
MECHA SENSOR SERIAL INPUT
CAPSTAN FG A PULSE
AUDIO MUTE CONTROL ("H" IN MUTE)
REC MUTE CONTROL ("H" IN MUTE)
HEAD SELECTION CONTROL ("L" IN SPECIAL PLAY HEAD)
EMBED CONTROL ("H" IN EMBEDDING)
HEAD CONTROL ("H" IN ALL HEADS ON)
CAPSTAN SERVO CONTROL ("H" IN CAPSTAN SERVO CONTROL)
CYLINDER MOTOR CIRCUIT CONTROL ("L" IN CYLINDER ON)
MECHA SENSOR SERIAL INPUT CONTROL
SUB-SERIAL TRANSMISSION OUTPUT
MICROCOMPUTER SELECT INPUT
CAPSTAN MOTOR CURRENT LIMITER CONTROL ("L" IN FF/REW SPEED REDUCTION)
CAPSTAN MOTOR CURRENT LIMITER CONTROL ("L" IN MODE SHIFT, FF/REW START)
CAPSTAN MOTOR CURRENT LIMITER CONTROL ("L" INTERMITTENT DRIVE ACCELERATION, MODE START)
CAPSTAN MOTOR CURRENT LIMITER CONTROL ("L" IN LOADING, INTERMITTENT DRIVE BRAKE)
50Hz/60Hz DISTINCTION ("L" IN 60Hz)
NTSC/CCIR CONTROL ("H" IN NTSC)
SUB-SERIAL TRANSMISSION INPUT
INTERMITTENT DRIVE CONTROL ("H" IN INTERMITTENT OPERATION)
VISS INPUT ("H" IN VISS SIGNAL DETECTION)
REC SPEED CONTROL (A, B "H" OUTPUT IN INPUT MODE)
CAPSTAN MOTOR ROTATION CONTROL ("L" IN MOTOR ON)
CAPSTAN MOTOR ROTATION DIRECTION CONTROL ("L" IN RVS ROTATION)
SERVO IC CONTROL
DEW HEATER CONTROL ("H" IN HEATER ON)
TAPE END LED CONTROL ("H" IN LED ON)
• : PUSH PULL OUTPUT
○ : "H" ACTIVE
● : "L" ACTIVE

MODE		HOLD	A	B
PLAY x2 CUE REV	SP	L	H	L
	LP	L	L	H
	EP	L	L	L
OTHERS	SP	H	H	L
	LP	H	L	H

Logic Sub Microcomputer Terminal Function


IC602
TMP47C860N–P028 (Z)
5V
5V
VDD
VAREF
NC
VASS
AUTO TRACKING
NC
NC
V.AGC
AUDIO MUTE IN
NC
CLOCK
NC
SIO S→M
SUPPLY
SIO M→S
TAKE UP
STEP
INSERT
TRK REF
SW PULSE
CTL PULSE
SLOW fH1
Ⓚ REF
SLOW fH2
HOLD
NC
X OUT
NC
X IN
TRACKING OUT
RESET
NC
STROBE
NC
DET
NC
CAP. ON
NC
DEW
NC
REC MUTE IN
NC
NC
NC
NC
NC
AUDIO MUTE
NC
NC
NC
NC
NC
NC
TV/VTR
VP ON
REC+B
NC
PLAY+B
NC
PRE PLAY+B
NC
TEST
NC
VSS
AUTO TRACKING CONTROL ("L" IN AUTO TRACKING MODE)
AUDIO MUTE INPUT (MUTE IN "H")
SERIAL DATA TRANSMISSION (TO MAIN LOGIC)
STEP SLOW INPUT (INTERMITTENT DRIVE IN "H")
TRACKING REFERENCE INPUT
CTL PULSE INPUT
Ⓚ REF INPUT
SERIAL TRANSMISSION STROBE INPUT
DET INPUT
CAPSTAN ON INPUT (MOTOR ON IN "L")
DEW DETECTION INPUT (DETECTION IN "L")
REC MUTE INPUT (MUTE IN "H")
AUDIO MUTE CONTROL (MUTE IN "H")
PSEUDO V SIGNAL ("H" IN SPECIAL PLAY)
V. AGC INPUT (A/D)
SUPPLY REEL PULSE INPUT
TAKE UP REEL PULSE INPUT
EMBED MODE INPUT (EMBED IN "H")
SWITCHING PULSE INPUT
CCIR CYLINDER JITTER COMPENSATION ("H" IN CCIR INTERMITTENT DRIVE)
NTSC CYLINDER JITTER COMPENSATION ("H" IN NTSC INTERMITTENT DRIVE)
TRACKING DELAY OUTPUT
TV/VTR SELECTION CONTROL ("L" IN VTR)
REC +B CONTROL ("L" IN REC MODE)
PLAY +B CONTROL ("L" IN PLAY MODE)
PLAY SYSTEM +B CONTROL ("L" IN PLAY MODE)
• : PUSH PULL OUTPUT
○ : "H" ACTIVE
● : "L" ACTIVE

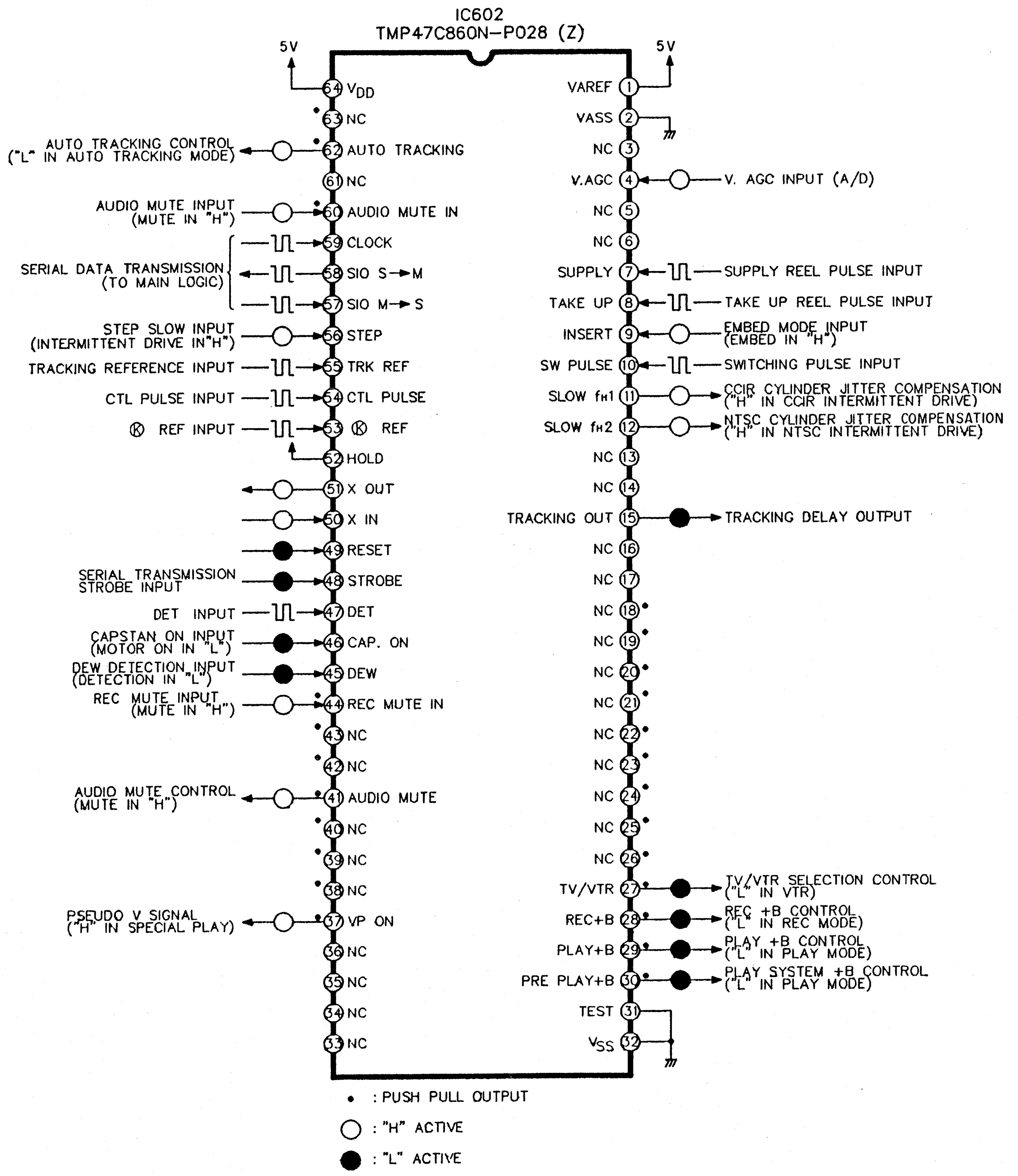
IC602 TMP47C860

No.		ACTIVE	SLOT IN	SLOT OUT
11	PAL fH	H	L	L
12	NTSC fH	H	L	L
15	TRKOUT	L	⊔	H
27	TV/VTR	L		
28	REC+B	L	H	H
29	PLAY+B	L	H	H
30	PREPLAY+B	L	H	H
37	VP ON	H	L	L
41	AUDIO MUTE	H	L	L
62	AUT TRK	L	L	L

IC601 TMP47C860

PiN No.	MODE / PORT NAME	ACTIVE	SLO IN
7	CAP LIM1	L	H
8	CAP LIM2	L	L/H
9	CAP LIM3	L	H
10	CAP LIM4	L	H
12	NTSC/$\overline{\text{CCIR}}$	H	L
14	STEP	H	L
16	SPEED HOLD	H	H
17	SPEED A	–	H
18	SPEED B	–	L
19	CAP ON	L	L
20	CAP F/$\bar{\text{R}}$	L	H
21	M 1	H	L
22	M 2	H	H
23	S 1	H	H/L
24	S 2	H	H/L
25	R/$\bar{\text{F}}$	H	L
26	M 3	H	H/L
29	HEATER ON	H	L/H
30	T.END LED	H	H
33	DM ON	L	H
34	$\overline{\text{SITLL}}$/SLOW	L	L/H
37	TRICK	H	L
38	INSERT	H	L
39	HEAD CTL	L	H
41	REC MUTE	H	H
42	AUDIO MUTE	H	L
60	LOAD (+)	L	H
61	LOAD (–)	L	H
62	LOADING	H	L
╳	MECHA POSITION	╳	I

Logic Sub Microcomputer Terminal Function


IC602
TMP47C860N–P028 (Z)
5V
5V
64 VDD
63 NC
AUTO TRACKING CONTROL ("L" IN AUTO TRACKING MODE)
62 AUTO TRACKING
61 NC
AUDIO MUTE INPUT (MUTE IN "H")
60 AUDIO MUTE IN
59 CLOCK
SERIAL DATA TRANSMISSION (TO MAIN LOGIC)
58 SIO S→M
57 SIO M→S
STEP SLOW INPUT (INTERMITTENT DRIVE IN "H")
56 STEP
TRACKING REFERENCE INPUT
55 TRK REF
CTL PULSE INPUT
54 CTL PULSE
Ⓚ REF INPUT
53 Ⓚ REF
52 HOLD
51 X OUT
50 X IN
49 RESET
SERIAL TRANSMISSION STROBE INPUT
48 STROBE
DET INPUT
47 DET
CAPSTAN ON INPUT (MOTOR ON IN "L")
46 CAP. ON
DEW DETECTION INPUT (DETECTION IN "L")
45 DEW
REC MUTE INPUT (MUTE IN "H")
44 REC MUTE IN
43 NC
42 NC
AUDIO MUTE CONTROL (MUTE IN "H")
41 AUDIO MUTE
40 NC
39 NC
38 NC
PSEUDO V SIGNAL ("H" IN SPECIAL PLAY)
37 VP ON
36 NC
35 NC
34 NC
33 NC
VAREF 1
VASS 2
NC 3
V.AGC 4
V. AGC INPUT (A/D)
NC 5
NC 6
SUPPLY 7
SUPPLY REEL PULSE INPUT
TAKE UP 8
TAKE UP REEL PULSE INPUT
INSERT 9
EMBED MODE INPUT (EMBED IN "H")
SW PULSE 10
SWITCHING PULSE INPUT
SLOW fH1 11
CCIR CYLINDER JITTER COMPENSATION ("H" IN CCIR INTERMITTENT DRIVE)
SLOW fH2 12
NTSC CYLINDER JITTER COMPENSATION ("H" IN NTSC INTERMITTENT DRIVE)
NC 13
NC 14
TRACKING OUT 15
TRACKING DELAY OUTPUT
NC 16
NC 17
NC 18
NC 19
NC 20
NC 21
NC 22
NC 23
NC 24
NC 25
NC 26
TV/VTR 27
TV/VTR SELECTION CONTROL ("L" IN VTR)
REC+B 28
REC +B CONTROL ("L" IN REC MODE)
PLAY+B 29
PLAY +B CONTROL ("L" IN PLAY MODE)
PRE PLAY+B 30
PLAY SYSTEM +B CONTROL ("L" IN PLAY MODE)
TEST 31
VSS 32
• : PUSH PULL OUTPUT
○ : "H" ACTIVE
● : "L" ACTIVE

	HOLD	A	B
SP	L	H	L
LP	L	L	H
EP	L	L	L
SP	H	H	L
LP	H	L	H

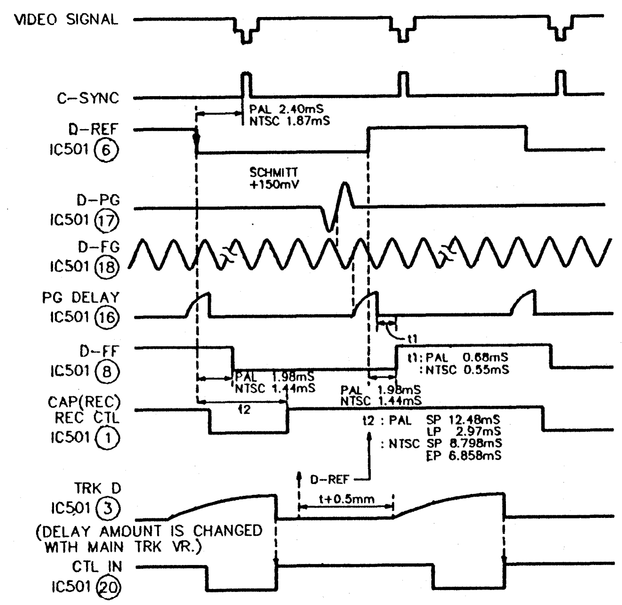
IC602 TMP47C860N-P028(Z) Sub Output Polarity

No.		ACTIVE	SLOT IN	SLOT OUT	LOAD-ING	UN-LOADING	STOP	FF	REW	FF *1	REW *1	CUE	REV IEW	PLAY	X2	STILL	SLOW		FRAME		REC	REC PAUSE	*1 (ZERO RETURN : WITHIN 1 MIN TIME SEARCH : WITHIN 1.5 MIN)
																	PAL	NTSC	PAL	NTSC			
11	PAL fH	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	⊓	L	⊓	L	L	L	
12	NTSC fH	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	⊓	L	⊓	L	L	
15	TRKOUT	L	⊔	H	⊔	H	⊔	H	H	H	H	H	H	⊔	⊔	H	H		H		H	H	*3 ALL "H" IN DT OFF MODE (OPEN)
27	TV/VTR	L										↓	↓	↓	↓	↓	↓						
28	REC+B	L	H	H	H/L	H	H	H	H	H	H	H	H	H	H	H	H		H		L	L	
29	PLAY+B	L	H	H	H	H	H	H	H	H	H	L	L	L	L	L	L		L		H	H	
30	PREPLAY+B	L	H	H	H/L	H	H	H	H	L	L	L	L	L	L	L	L		L		H	H	
37	VP ON	H	L	L	L	L	L	L	L	L	L	H	H	L	H	H	H		H		L	L	
41	AUDIO MUTE	H	L	L	L	L	L	L	L	L	L	H	H	L	L	H	H		H		L	L	
62	AUT TRK	L	L	L	L	L	L	L	L	L	L	H	H	L	L	L	L		L		L	L	*2 ALL "H" IN DT OFF MODE

IC601 TMP47C860N-P031(Z) Main Output Polarity

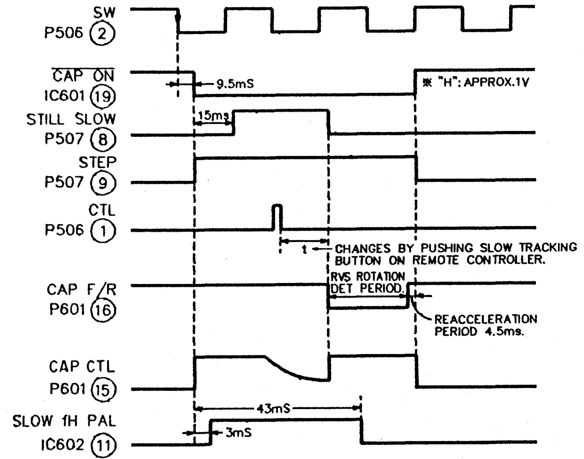
PIN No.	PORT NAME \ MODE	ACTIVE	SLOT IN	SLOT OUT	LOAD-ING	UN-LOADING	STOP	FF	REW	CUE	REV	PLAY	X2	STILL	SLOW	REC	REC PAUSE	NOTE
7	CAP LIM1	L	H	H	H	H	H	H/L①	H/L①	H	H	H	H	H	H	H	H	① "L" IN SPEED REDUCTION
8	CAP LIM2	L	L/H	H	H/L	L	H	②L/H	②L/H	H	H	H	H	H/L③	④⊔	H	H	② "L" IN STARTING
9	CAP LIM3	L	H	H	H/L	H	H	H	H	②L/H	②L/H	②L/H	②L/H	L/H	⊔⑤	②L/H	H	③ "L" IN CAP OFF ④ "L" IN PAL LP ONLY
10	CAP LIM4	L	H	H	H	H	H	H	H	H	H	H	H	⑦L/H	⑥⊔	H	H	⑤,⑥,REVERSED IN PAL LP ⑦ "L" IN BRAKE
12	NTSC/$\overline{\text{CCIR}}$	H	L	L	L	L	L	L	L	H/L	H/L	H/L	H/L	HOLD	HOLD	L	L	
14	STEP	H	L	L	L	L	L	L	L	L	L	L	L	⑧L/H	⊓	L	L	⑧ "H" IN STARTING
16	SPEED HOLD	H	H	H	H	H	H	H	H	L	L	L	L	H	H	H	H	
17	SPEED A	–	H	H	H	H	H	H	H	H (LATCH)	H (LATCH)	H (LATCH)	H (LATCH)	HOLD	HOLD	H	H	
18	SPEED B	–	L	L	L	L	L	L	L	H (LATCH)	H (LATCH)	H (LATCH)	H (LATCH)	HOLD	HOLD	L	L	
19	CAP ON	L	L	L	H/L	H/L	H	L	L	L	L	L	L	⑨L/H	⊔	L	L	⑨ "L" IN STARTING
20	CAP F/$\overline{\text{R}}$	L	H	L	H	L	H	H	L	H	L	H	H	⑩L/H	⊔	H	H	⑩ "L" IN BRAKE
21	M 1	H	L	L	L	L	L	L	L	H	H	H	H	H	H	L	L	
22	M 2	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H	
23	S 1	H	H/L	L	L	H/L	L	H/L	H/L	L	L	L	H	L	L	L	L	
24	S 2	H	H/L	H	L	H/L	L	H/L	H/L	H	H	L	L	L	L	L	L	
25	R/$\overline{\text{F}}$	H	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	
26	M 3	H	H/L	H	L	H/L	L	H	H	H	H	L	H	H	H	L/H⑪	L	⑪ "H" IN AUTO FIND INPUTTING
29	HEATER ON	H	L/H	L/H	L	L	H/L	L	L	L	L	L	L	L	L	L	L	
30	T.END LED	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	
33	DM ON	L	H	H	L	L/H⑫	L/H⑬	L	L	L	L	L	L	L	L	L	L	⑫ "H" IN DEW ⑬ "H" AFTER 5 MIN.
34	$\overline{\text{SITLL}}$/SLOW	L	L/H	L/H	L/H	H/L	L/H	H/L	H/L	H	H	H	H	⑭L/H	⊓	H	L	⑭ "L" IN BRAKE
37	TRICK	H	L	L	H/L	L	L	L	L	H/L⑱	H/L⑱	L	H	H	H	H	H	⑱ "L" IN NTSC ⑲ "H" IN SP
38	INSERT	H	L	L	H/L	L	L	L	L	H/L	H/L	L	H/L⑲	⑳H/L	L	L	L	⑳ "H" IN SP OR PAL LP STARTING
39	HEAD CTL	L	H	H	H	H	H	H	H	H	H	H	L	㉑H/L	⊓	H	H	㉑ "H" IN STARTING
41	REC MUTE	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H	
42	AUDIO MUTE	H	L	L	L	L	L	L	L	H	H	L	L	H	H	L	L	
60	LOAD (+)	L	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	
61	LOAD (–)	L	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H	
62	LOADING	H	L	L	H	H	L	L/H	L/H	L	L	L	L	L	L	L	L	
☒	MECHA POSITION	☒	I	I	IV	IV	VII ㉒	VIII	VIII	VI	V	VI	VI	VI	VI	VI	VI	㉒ II POS IN DEW

11-1. Servo Block Diagram



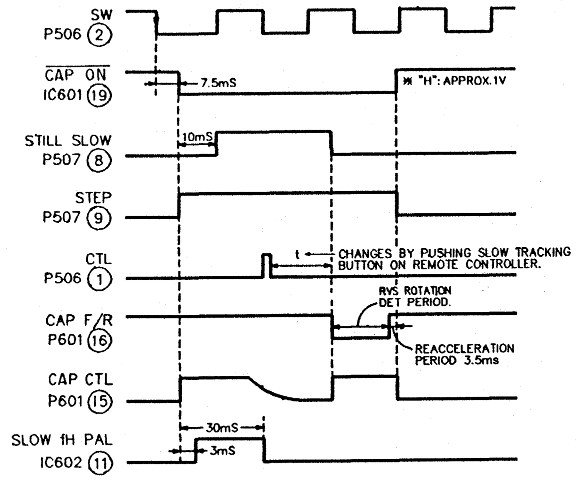
VIDEO SIGNAL
C-SYNC
PAL 2.40mS
NTSC 1.87mS
D-REF IC501 ⑥
SCHMITT +150mV
D-PG IC501 ⑰
D-FG IC501 ⑱
PG DELAY IC501 ⑯
t1
D-FF IC501 ⑧
t1: PAL 0.68mS
: NTSC 0.55mS
PAL 1.98mS
NTSC 1.44mS
CAP(REC) REC CTL IC501 ①
t2
PAL 1.98mS
NTSC 1.44mS
t2 : PAL SP 12.48mS
LP 2.97mS
: NTSC SP 8.798mS
EP 6.858mS
D-REF
t+0.5mm
TRK D IC501 ③
(DELAY AMOUNT IS CHANGED WITH MAIN TRK VR.)
CTL IN IC501 ⑳

Servo IC Timing Chart



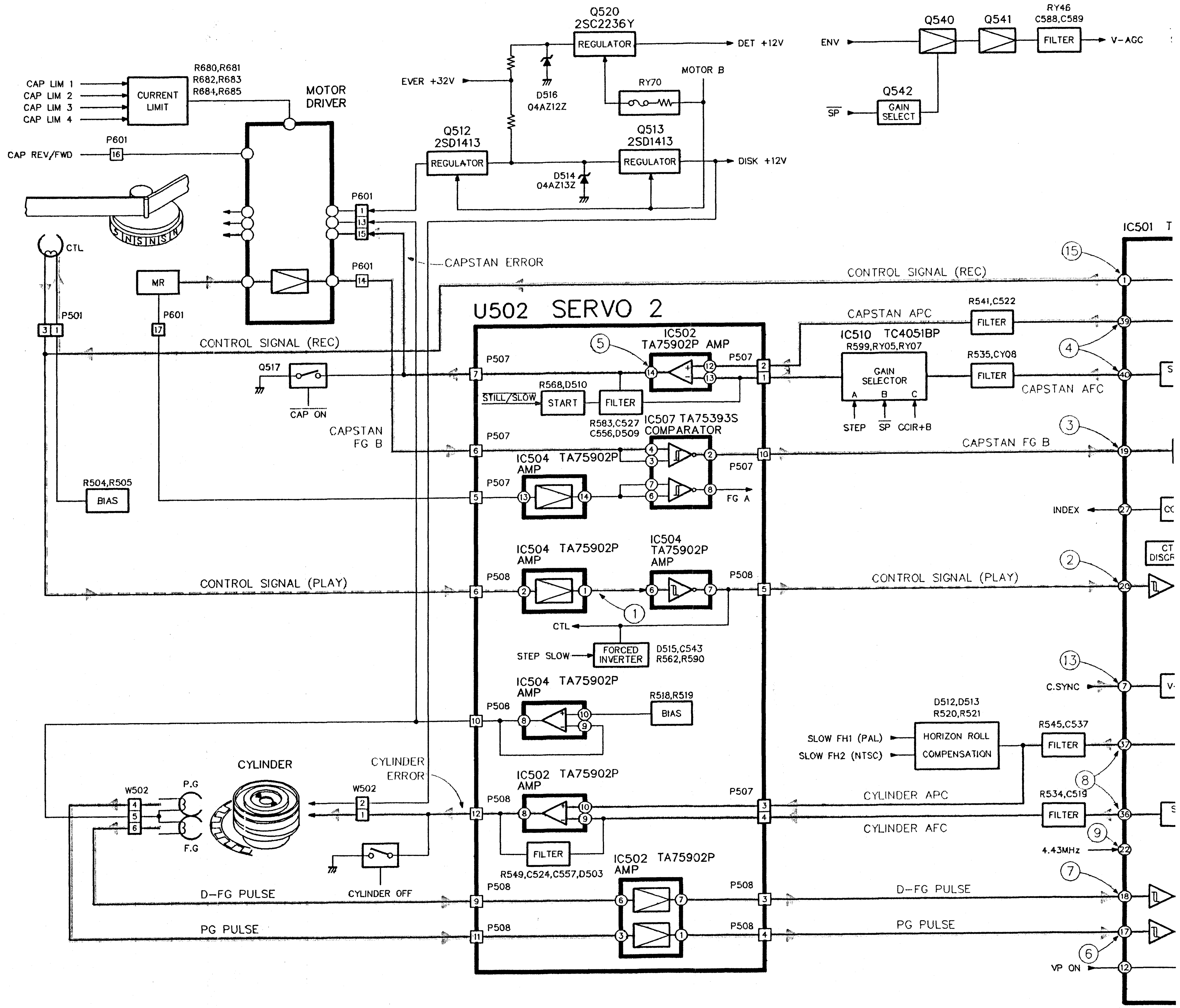
SW P506 ②
CAP ON IC601 ⑲
9.5mS
※ "H": APPROX.1V
STILL SLOW P507 ⑧
15ms
STEP P507 ⑨
CTL P506 ①
t
CHANGES BY PUSHING SLOW TRACKING BUTTON ON REMOTE CONTROLLER.
RVS ROTATION DET PERIOD.
CAP F/R P601 ⑯
REACCELERATION PERIOD 4.5ms.
CAP CTL P601 ⑮
43mS
SLOW 1H PAL IC602 ⑪
3mS

Slow Timing Chart (SP)

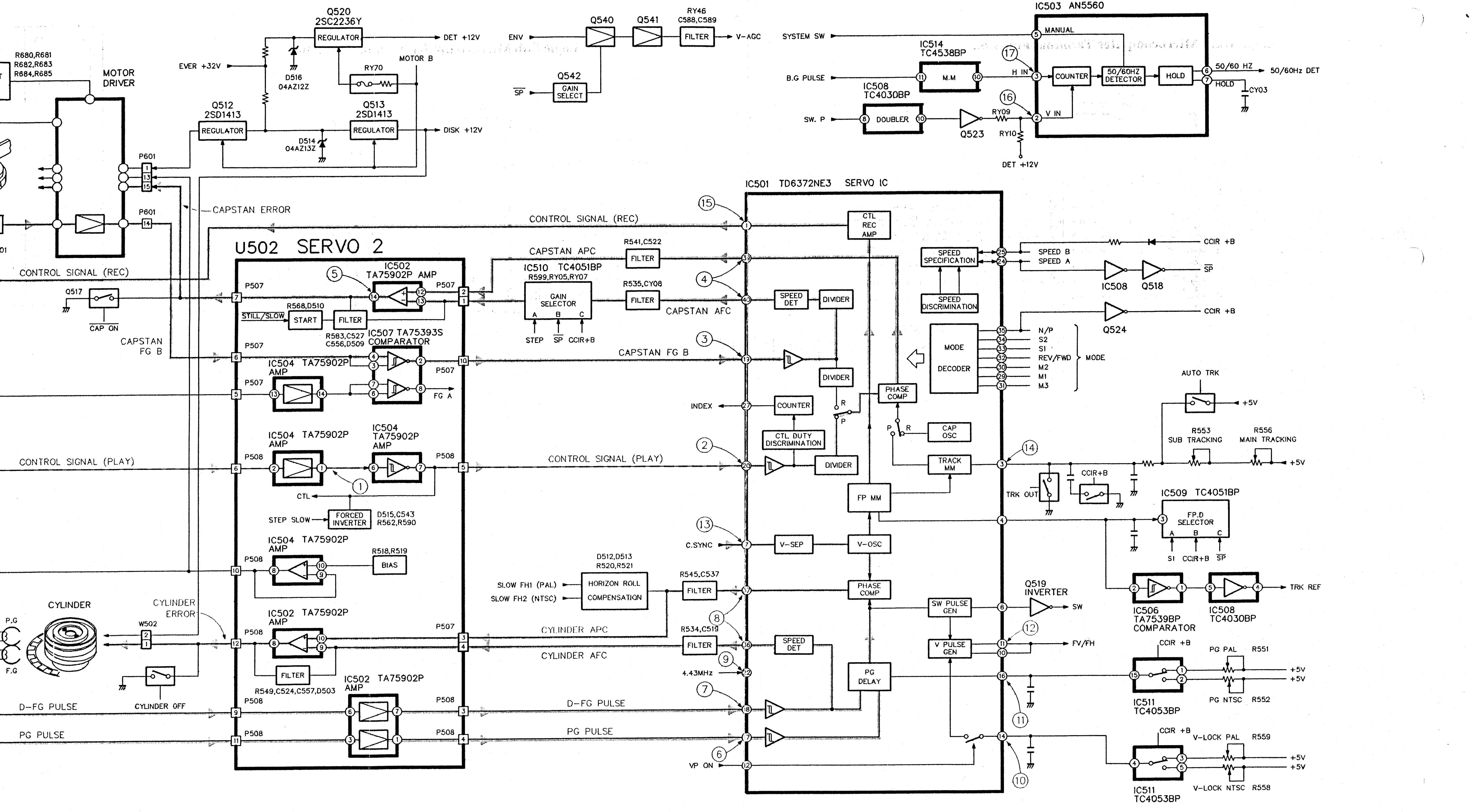


SW P506 ②
CAP ON IC601 ⑲
7.5mS
※ "H": APPROX.1V
STILL SLOW P507 ⑧
10mS
STEP P507 ⑨
CTL P506 ①
t
CHANGES BY PUSHING SLOW TRACKING BUTTON ON REMOTE CONTROLLER.
RVS ROTATION DET PERIOD.
CAP F/R P601 ⑯
REACCELERATION PERIOD 3.5ms
CAP CTL P601 ⑮
30mS
SLOW 1H PAL IC602 ⑪
3mS

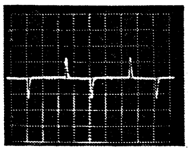
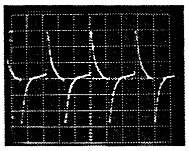
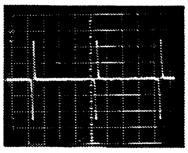
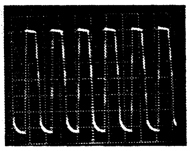
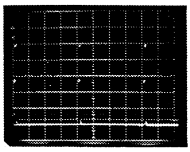
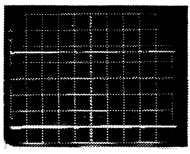
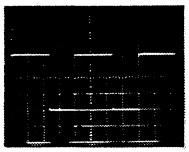
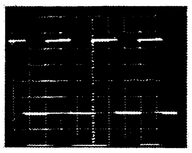
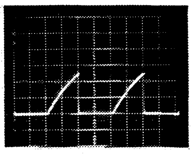
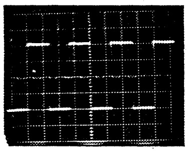
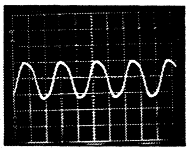
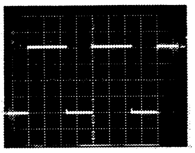
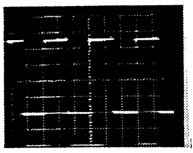
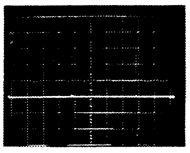
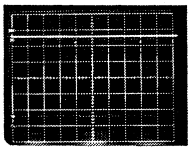
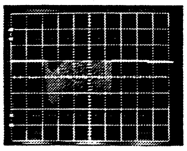
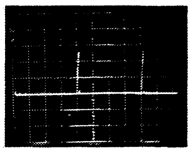
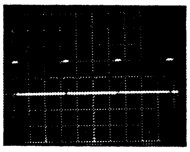
Slow Timing Chart (PAL LP)



CAP LIM 1
CAP LIM 2
CAP LIM 3
CAP LIM 4
CURRENT LIMIT
R680,R681
R682,R683
R684,R685
MOTOR DRIVER
CAP REV/FWD
P601
16
CTL
MR
P501
P601
17
P601
1
13
15
P601
14
CAPSTAN ERROR
Q520
2SC2236Y
REGULATOR
DET +12V
EVER +32V
D516
04AZ12Z
RY70
MOTOR B
Q512
2SD1413
REGULATOR
Q513
2SD1413
REGULATOR
DISK +12V
D514
04AZ13Z
ENV
Q540
Q541
RY46
C588,C589
FILTER
V-AGC
SP
Q542
GAIN SELECT
IC501
CONTROL SIGNAL (REC)
U502 SERVO 2
CONTROL SIGNAL (REC)
Q517
CAP ON
CAPSTAN FG B
P507
IC502 TA75902P AMP
STILL/SLOW
START
FILTER
R568,D510
R583,C527
C556,D509
IC507 TA75393S COMPARATOR
IC504 TA75902P AMP
R504,R505
BIAS
FG A
CAPSTAN APC
R541,C522
FILTER
IC510 TC4051BP
R599,RY05,RY07
GAIN SELECTOR
A B C
STEP
SP
CCIR+B
R535,CY08
FILTER
CAPSTAN AFC
CAPSTAN FG B
INDEX
CONTROL SIGNAL (PLAY)
IC504 TA75902P AMP
IC504 TA75902P AMP
P508
CTL
STEP SLOW
FORCED INVERTER
D515,C543
R562,R590
CONTROL SIGNAL (PLAY)
C.SYNC
IC504 TA75902P AMP
R518,R519
BIAS
D512,D513
R520,R521
SLOW FH1 (PAL)
SLOW FH2 (NTSC)
HORIZON ROLL COMPENSATION
R545,C537
FILTER
CYLINDER
CYLINDER ERROR
W502
P.G
F.G
IC502 TA75902P AMP
FILTER
R549,C524,C557,D503
CYLINDER OFF
IC502 TA75902P AMP
CYLINDER APC
CYLINDER AFC
R534,C519
FILTER
4.43MHz
D-FG PULSE
D-FG PULSE
PG PULSE
PG PULSE
VP ON


U502 SERVO 2
IC501 TD6372NE3 SERVO IC
IC503 AN5560
IC514 TC4538BP
IC508 TC4030BP
Q520 2SC2236Y
Q512 2SD1413
Q513 2SD1413
REGULATOR
DET +12V
DISK +12V
EVER +32V
D516 04AZ12Z
D514 04AZ13Z
RY70
MOTOR B
R680,R681
R682,R683
R684,R685
MOTOR DRIVER
P601
CAPSTAN ERROR
ENV
Q540
Q541
RY46 C588,C589
FILTER
V-AGC
Q542
GAIN SELECT
SP
SYSTEM SW
B.G PULSE
SW. P
M.M
DOUBLER
Q523
RY09
RY10
DET +12V
MANUAL
H IN
V IN
COUNTER
50/60HZ DETECTOR
HOLD
50/60 HZ
50/60Hz DET
CY03
CONTROL SIGNAL (REC)
CAPSTAN APC
CAPSTAN AFC
CAPSTAN FG B
CONTROL SIGNAL (PLAY)
C.SYNC
SLOW FH1 (PAL)
SLOW FH2 (NTSC)
HORIZON ROLL COMPENSATION
D512,D513 R520,R521
R541,C522
R535,CY08
R545,C537
R534,C519
CYLINDER APC
CYLINDER AFC
4.43MHz
D-FG PULSE
PG PULSE
VP ON
INDEX
IC502 TA75902P AMP
IC507 TA75393S COMPARATOR
IC504 TA75902P AMP
IC510 TC4051BP
R599,RY05,RY07
GAIN SELECTOR
STEP
CCIR+B
P507
P508
Q517
CAP ON
STILL/SLOW
START
R568,D510
R583,C527 C556,D509
FG A
CTL
STEP SLOW
FORCED INVERTER
D515,C543 R562,R590
R518,R519
BIAS
R549,C524,C557,D503
CYLINDER
CYLINDER ERROR
W502
P.G
F.G
CYLINDER OFF
CTL REC AMP
SPEED DET
DIVIDER
SPEED SPECIFICATION
SPEED DISCRIMINATION
MODE DECODER
PHASE COMP
CTL DUTY DISCRIMINATION
CAP OSC
TRACK MM
FP MM
V-SEP
V-OSC
SW PULSE GEN
V PULSE GEN
PG DELAY
SPEED B
SPEED A
CCIR +B
IC508
Q518
Q524
N/P
S2
S1
REV/FWD
M2
M1
M3
MODE
AUTO TRK
+5V
R553 SUB TRACKING
R556 MAIN TRACKING
TRK OUT
IC509 TC4051BP
FP.D SELECTOR
CCIR+B
IC506 TA7539BP COMPARATOR
IC508 TC4030BP
TRK REF
Q519 INVERTER
SW
FV/FH
IC511 TC4053BP
PG PAL R551
PG NTSC R552
V-LOCK PAL R559
V-LOCK NTSC R558
①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
⑫
⑬
⑭
⑮
⑯
⑰

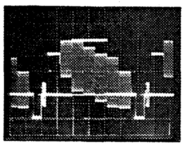
Cylinder Servo **Capstan Servo**

① a: IC504, Pin ① (PLAY)  V: 0.5V/div. H: 10ms/div. ① b: IC504, Pin ① (CUE)  V: 0.5V/div. H: 2ms/div.	⑥ IC501, Pin ⑰  V: 0.2V/div. H: 10ms/div. ⑦ IC501, Pin ⑱  V: 0.5V/div. H: 1ms/div.	⑫ IC501, Pin ⑪ (STILL)  V: 1V/div. H: 5ms/div. ⑬ IC501, Pin ⑦ (EE)  V: 1V/div. H: 5ms/div.
② IC501, Pin ⑳ (PLAY)  V: 1V/div. H: 10ms/div.	⑧ IC501, Pin ㊱, ㊲  V: 1V/div. H: 10 μs/div.	⑭ IC501, Pin ③ (PLAY)  V: 1V/div. H: 10ms/div.
③ IC501, Pin ⑲  V: 1V/div. H: 0.5ms/div.	⑨ IC501, Pin ㉒ (POWER)  V: 0.2V/div. H: 0.1μs/div.	⑮ IC501, Pin ① (REC)  V: 1V/div. H: 10ms/div.
④ IC501, Pin ㊴, ㊵  V: 1V/div. H: 10 μs/div.	⑩ IC501, Pin ⑭ (STILL)  V: 1V/div. H: 5ms/div.	⑯ IC503, Pin ② (PLAY)  V: 2V/div. H: 5ms/div.
⑤ IC502, Pin ⑭ (SLOW)  V: 1V/div. H: 10ms/div.	⑪ IC501, Pin ⑯ (PLAY)  V: 1V/div. H: 5ms/div.	⑰ IC503, Pin ③ (PLAY)  V: 1V/div. H: 20 μs/div.

12-1. Video Block Diagram

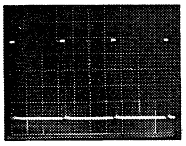
REC Mode

① TP201 (VIDEO IN)



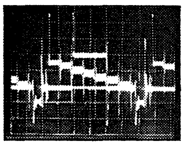
V: 0.2V/div.
H: 10 μs/div.

② TP204 (C.SYNC)



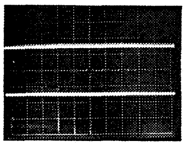
V: 1V/div.
H: 20 μs/div.

③ TP206



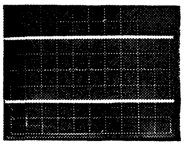
V: 0.1V/div.
H: 10 μs/div.

④ TP202 (REC FM LP)



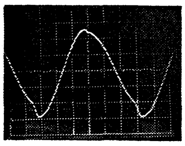
V: 0.1V/div.
H: 10 μs/div.

⑤ TP202 (REC FM SP)



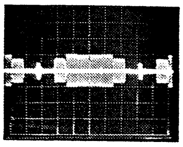
V: 0.1V/div.
H: 10 μs/div.

⑥ TP234 (SECAM DET)



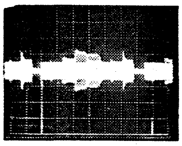
V: 1V/div.
H: 20 μs/div.

⑦ TP208 (REC PAL SP)



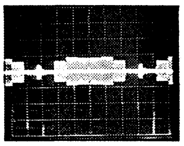
V: 0.1V/div.
H: 10 μs/div.

⑧ TP208 (MESECAM SP)



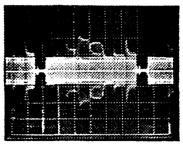
V: 0.1V/div.
H: 10 μs/div.

⑨ TP208 (REC PAL LP)



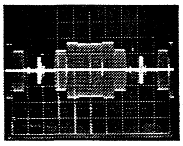
V: 0.1V/div.
H: 10 μs/div.

⑩ IC401, Pin ⑫ (MESECAM)



V: 0.2V/div.
H: 10 μs/div.

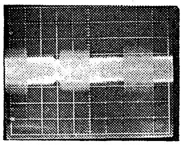
⑪ IC401, Pin ⑫ (PAL)



V: 0.2V/div.
H: 10 μs/div.

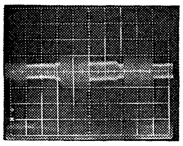
PLAY Mode

⑫ TP101 (PAL SP)



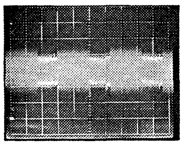
V: 0.1V/div.
H: 5ms/div.

⑬ TP101 (PAL LP)



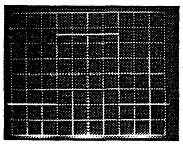
V: 0.1V/div.
H: 5ms/div.

⑭ TP101 (NTSC SP)



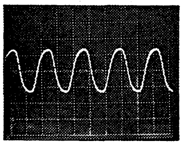
V: 0.1V/div.
H: 5ms/div.

⑮ TP103



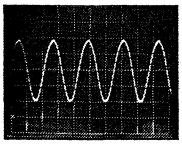
V: 1V/div.
H: 5ms/div.

⑯ TP211 (4.43MHz CW)

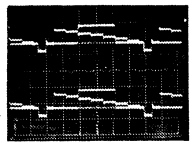
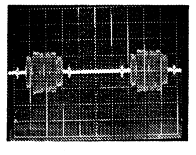
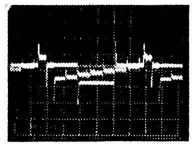
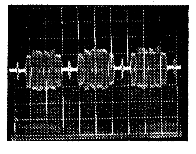
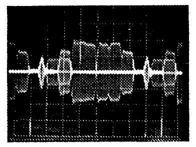
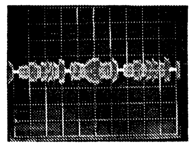
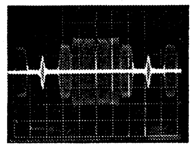
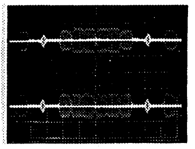
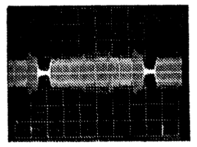
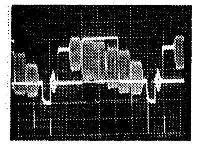
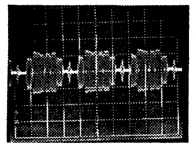
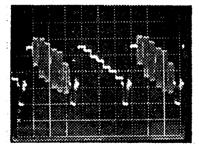


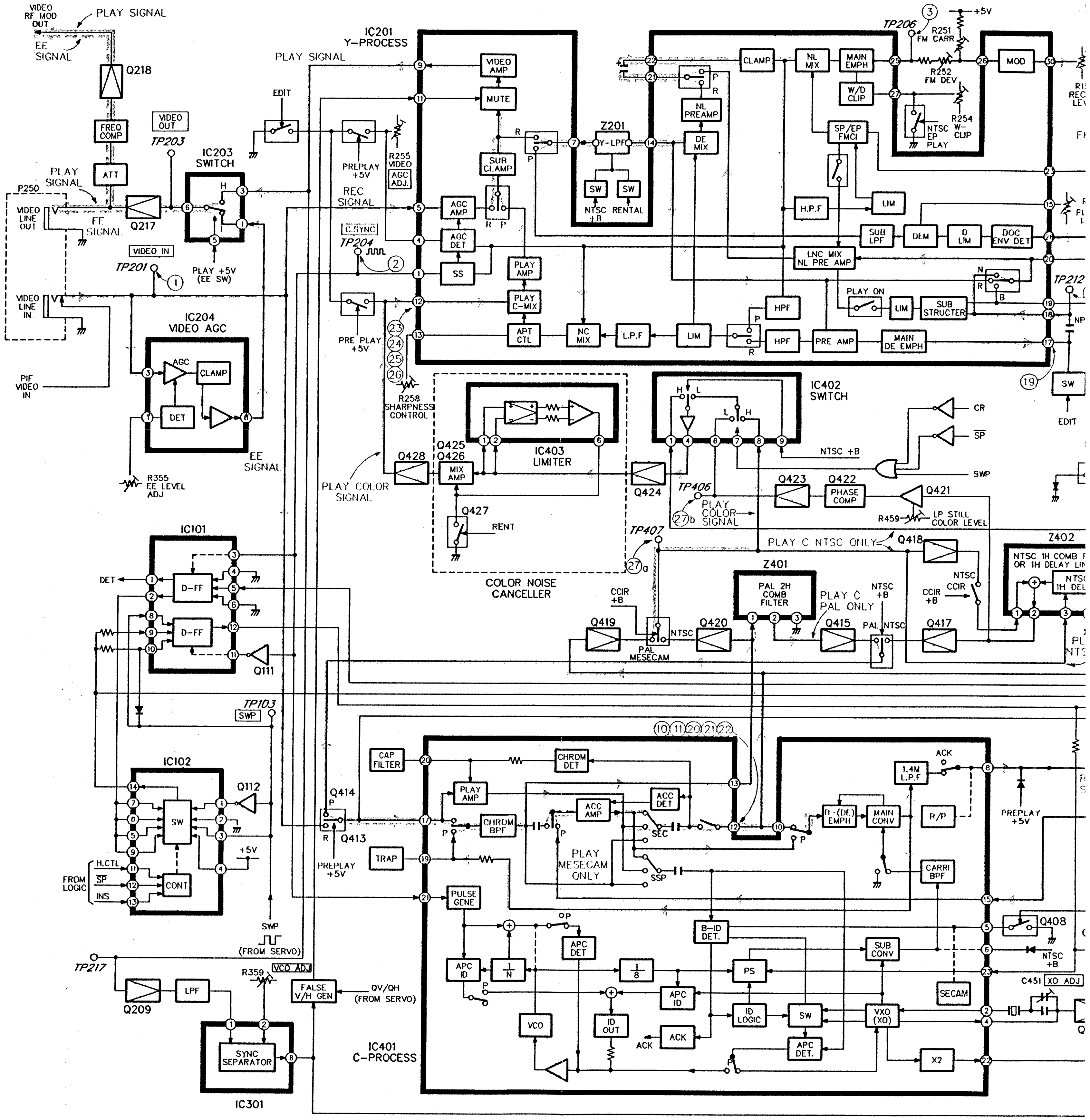
V: 0.2V/div.
H: 0.1μs/div.

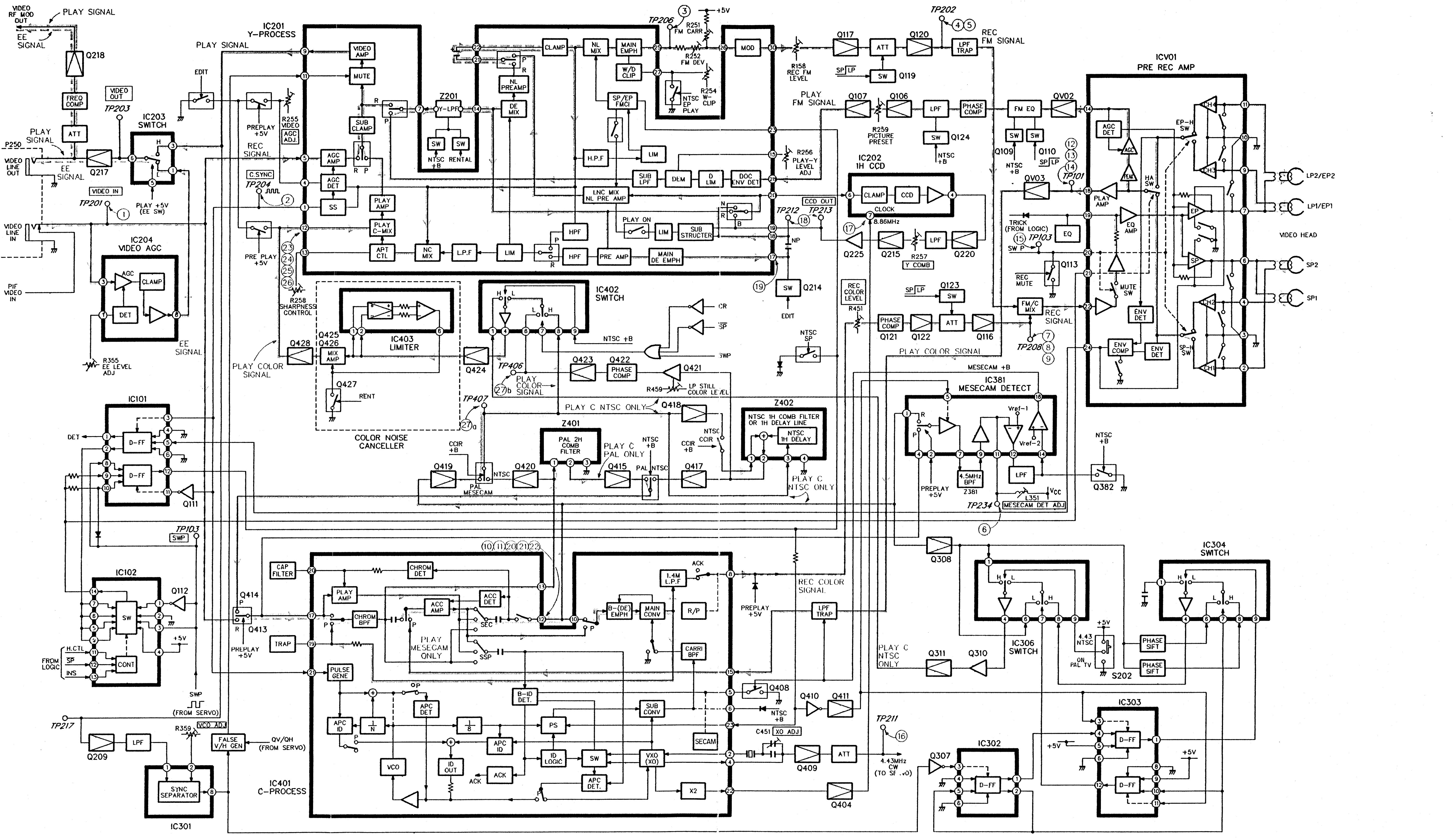
⑰ IC202, Pin ⑦



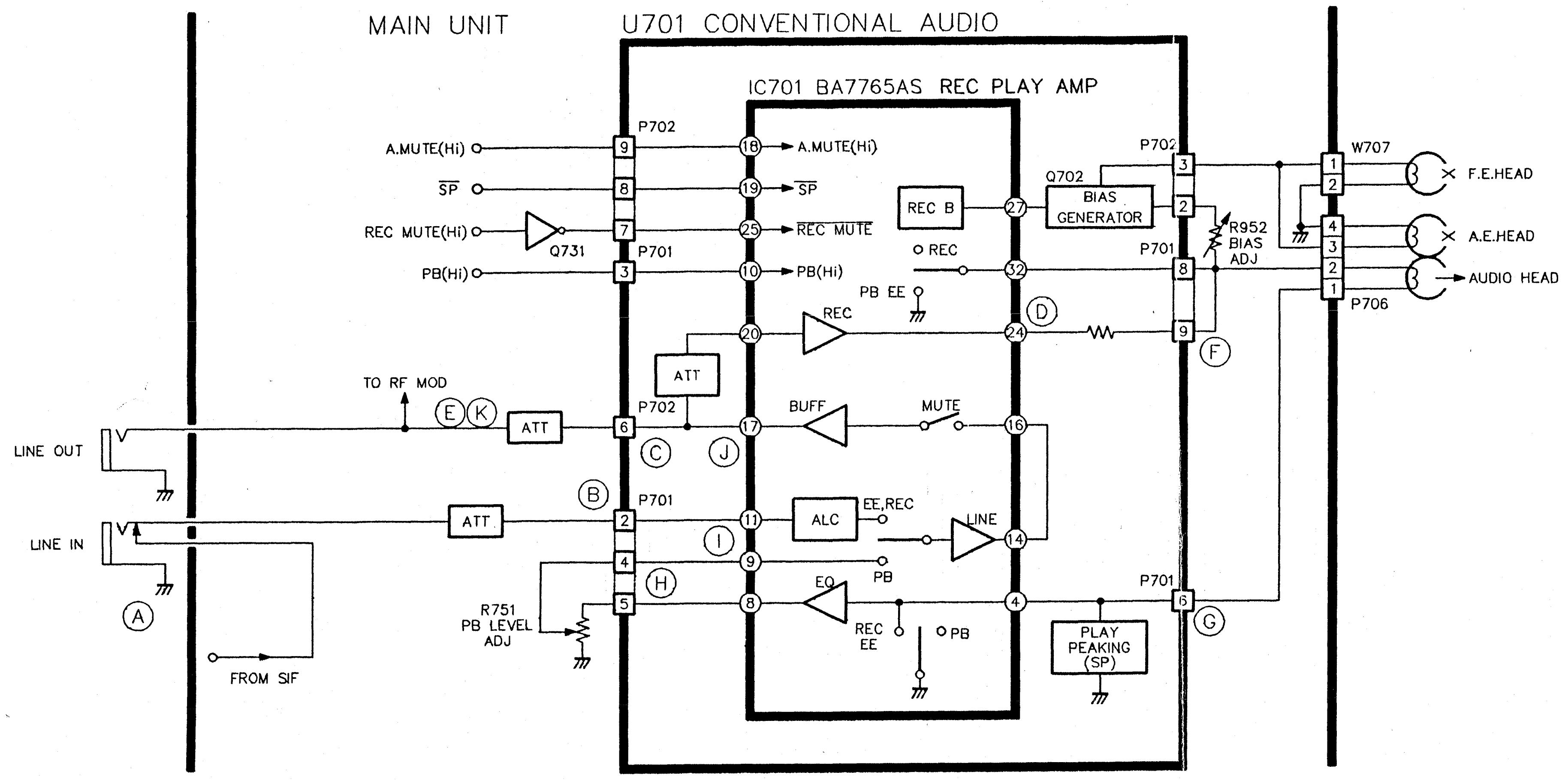
V: 0.2V/div.
H: 50ns/div.

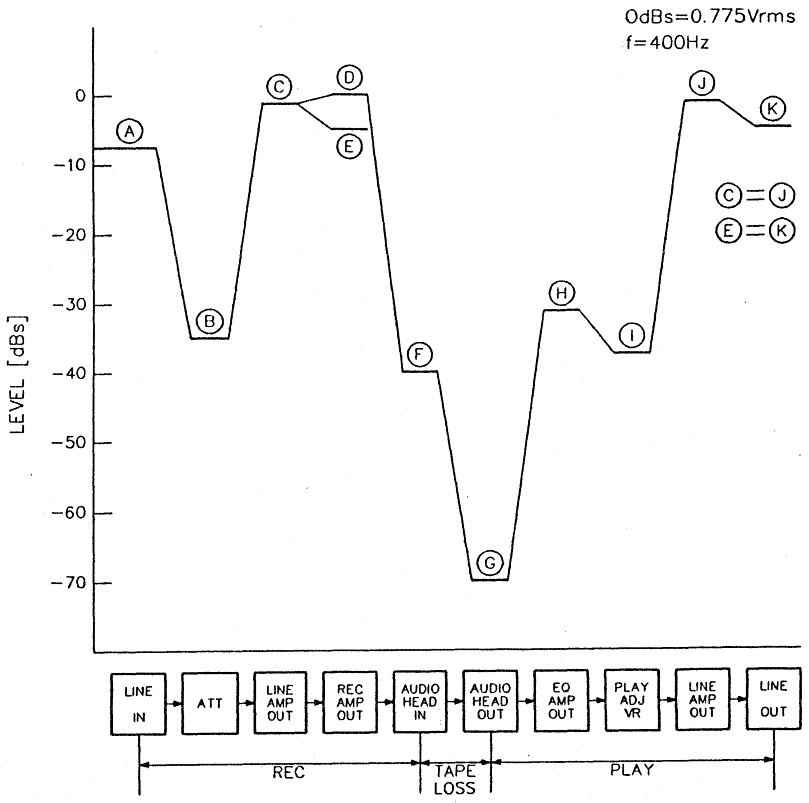
⑱ a: TP213 b: TP212  V: 0.2V/div. H: 10 μs/div.	㉔ IC201, Pin ⑫ (NTSC/PAL)  V: 0.2V/div. H: 20 μs/div.
⑲ IC201, Pin ⑰  V: 0.2V/div. H: 10 μs/div.	㉕ IC201, Pin ⑫ (PAL)  V: 0.2V/div. H: 20 μs/div.
⑳ IC401, Pin ⑫ (4.43MHz NTSC)  V: 0.2V/div. H: 10 μs/div.	㉖ IC201, Pin ⑫ (MESECAM)  V: 0.2V/div. H: 20 μs/div.
㉑ IC401, Pin ⑫ (PAL)  V: 0.2V/div. H: 10 μs/div.	㉗ a: TP407 (PAL LP) b: TP406  V: 0.5V/div. H: 10 μs/div.
㉒ IC401, Pin ⑫ (MESECAM)  V: 0.2V/div. H: 10 μs/div.	㉘ TP203  V: 0.5V/div. H: 10 μs/div.
㉓ IC201, Pin ⑫ (4.43MHz NTSC)  V: 0.2V/div. H: 20 μs/div.	㉙ TP203 (NTSC/PAL)  V: 0.5V/div. H: 20 μs/div.


VIDEO RF MOD OUT
PLAY SIGNAL
EE SIGNAL
Q218
FREQ COMP
ATT
PLAY SIGNAL
P250
VIDEO LINE OUT
EE SIGNAL
Q217
VIDEO LINE IN
PIF VIDEO IN
VIDEO OUT
TP203
IC203 SWITCH
H
L
PLAY +5V (EE SW)
VIDEO IN
TP201
①
IC204 VIDEO AGC
AGC
CLAMP
DET
R355 EE LEVEL ADJ
EE SIGNAL
IC101
DET
D-FF
D-FF
Q111
TP103
SWP
IC102
SW
CONT
Q112
+5V
H.CTL
SP
INS
FROM LOGIC
SWP
(FROM SERVO)
TP217
Q209
LPF
R359
VCO ADJ
FALSE V/H GEN
QV/QH (FROM SERVO)
SYNC SEPARATOR
IC301
EDIT
PLAY SIGNAL
IC201 Y-PROCESS
PREPLAY +5V
R255 VIDEO AGC ADJ
REC SIGNAL
C.SYNC
TP204
②
PRE PLAY +5V
㉓
㉔
㉕
㉖
R258 SHARPNESS CONTROL
VIDEO AMP
MUTE
SUB CLAMP
AGC AMP
AGC DET
SS
PLAY AMP
PLAY C-MIX
APT CTL
NC MIX
L.P.F
LIM
Z201
Y-LPF
SW
SW
NTSC RENTAL
NL PREAMP
DE MIX
HPF
HPF
PRE AMP
MAIN DE EMPH
CLAMP
NL MIX
MAIN EMPH
W/D CLIP
SP/EP FMCI
H.P.F
LIM
SUB LPF
DEM
D LIM
DOC ENV DET
LNC MIX NL PRE AMP
PLAY ON
LIM
SUB STRUCTER
TP206
③
+5V
R251 FM CARR
R252 FM DEV
R254 W-CLIP
NTSC EP PLAY
MOD
TP212
⑲
SW
EDIT
CR
SP
SWP
Q425
Q426
Q428
MIX AMP
IC403 LIMITER
Q427
RENT
COLOR NOISE CANCELLER
PLAY COLOR SIGNAL
Q424
IC402 SWITCH
NTSC +B
TP406
PLAY COLOR SIGNAL
㉗b
Q423
Q422
PHASE COMP
Q421
R459
LP STILL COLOR LEVEL
TP407
㉗a
PLAY C NTSC ONLY
Q418
Z402
NTSC 1H COMB
CCIR +B
Q419
PAL MESECAM
NTSC
Q420
Z401
PAL 2H COMB FILTER
PLAY C PAL ONLY
NTSC +B
Q415
PAL NTSC
CCIR +B
CCIR
NTSC
Q417
⑩⑪⑳㉑㉒
CAP FILTER
CHROM DET
PLAY AMP
CHROM BPF
ACC AMP
ACC DET
SEC
PLAY MESECAM ONLY
SSP
Q414
Q413
PREPLAY +5V
TRAP
PULSE GENE
APC ID
1/N
APC DET
1/8
APC ID
ID OUT
ACK
ACK
VCO
B-ID DET.
PS
ID LOGIC
SW
APC DET.
SUB CONV
VXO (XO)
X2
SECAM
IC401 C-PROCESS
(I)-(DE) EMPH
MAIN CONV
R/P
CARRI BPF
1.4M L.P.F
ACK
PREPLAY +5V
Q408
NTSC +B
C451
XO ADJ


VIDEO RF MOD OUT
PLAY SIGNAL
EE SIGNAL
Q218
FREQ COMP
ATT
VIDEO OUT
TP203
IC203 SWITCH
PLAY SIGNAL
P250
VIDEO LINE OUT
Q217
EE SIGNAL
VIDEO IN
TP201
PLAY +5V (EE SW)
VIDEO LINE IN
PIF VIDEO IN
IC204 VIDEO AGC
AGC
CLAMP
DET
R355 EE LEVEL ADJ
EE SIGNAL
EDIT
PREPLAY +5V
R255 VIDEO AGC ADJ.
REC SIGNAL
C.SYNC
TP204
PRE PLAY +5V
R258 SHARPNESS CONTROL
IC201 Y-PROCESS
VIDEO AMP
MUTE
SUB CLAMP
AGC AMP
AGC DET
SS
PLAY AMP
PLAY C-MIX
APT CTL
NC MIX
L.P.F
LIM
HPF
PRE AMP
MAIN DE EMPH
Z201 Y-LPF
SW
NTSC +B
RENTAL
CLAMP
NL MIX
MAIN EMPH
W/D CLIP
NL PREAMP
DE MIX
SP/EP FMCI
H.P.F
LIM
SUB LPF
DEM
D LIM
DOC ENV DET
LNC MIX NL PRE AMP
PLAY ON
SUB STRUCTER
MOD
TP206
R251 FM CARR
+5V
R252 FM DEV
R254 W-CLIP
NTSC EP PLAY
R158 REC FM LEVEL
R256 PLAY-Y LEVEL ADJ
TP212
TP213
CCD OUT
NP
Q214
EDIT
TP202
Q117
ATT
Q120
LPF TRAP
REC FM SIGNAL
SP/LP
SW
Q119
PLAY FM SIGNAL
Q107
Q106
R259 PICTURE PRESET
LPF
PHASE COMP
SW
Q124
NTSC +B
IC202 1H CCD
CLAMP
CCD
CLOCK
8.86MHz
Q225
Q215
R257 Y COMB
Q220
FM EQ
QV02
Q109
Q110
NTSC +B
SP/LP
TP101
QV03
TRICK (FROM LOGIC)
TP103
SW P
EQ
REC MUTE
Q113
FM/C MIX
REC SIGNAL
TP208
Q123
PHASE COMP
Q121
Q122
ATT
Q116
REC COLOR LEVEL R451
NTSC SP
PLAY COLOR SIGNAL
ICV01 PRE REC AMP
AGC DET
AGC
PEAK
EP-H SW
HA SW
PLAY AMP
EQ AMP
MUTE SW
ENV DET
ENV COMP
ENV DET
SP-H SW
CH4
CH3
EP
SP
CH2
CH1
LP2/EP2
LP1/EP1
VIDEO HEAD
SP2
SP1
IC403 LIMITER
Q425 Q426
Q428
MIX AMP
Q427
RENT
COLOR NOISE CANCELLER
PLAY COLOR SIGNAL
IC402 SWITCH
CR
SP
SWP
NTSC +B
Q424
TP406
PLAY COLOR SIGNAL
Q423
Q422
PHASE COMP
Q421
R459 LP STILL COLOR LEVEL
TP407
PLAY C NTSC ONLY
Q418
Z402
NTSC 1H COMB FILTER OR 1H DELAY LINE
NTSC 1H DELAY
NTSC CCIR
CCIR +B
Z401 PAL 2H COMB FILTER
PLAY C PAL ONLY
NTSC +B
Q419
Q420
Q415
Q417
PAL MESECAM
PAL NTSC
PLAY C NTSC ONLY
MESECAM +B
IC381 MESECAM DETECT
Vref-1
Vref-2
4.5MHz BPF Z381
PREPLAY +5V
LPF
L351
Vcc
TP234
MESECAM DET ADJ
NTSC +B
Q382
IC101
DET
D-FF
Q111
TP103
SWP
IC102
Q112
SW
CONT
H.CTL
SP
INS
FROM LOGIC
+5V
SWP
(FROM SERVO)
TP217
Q209
LPF
R359
VCO ADJ
FALSE V/H GEN
QV/QH (FROM SERVO)
SYNC SEPARATOR
IC301
Q414
Q413
PREPLAY +5V
CAP FILTER
TRAP
IC401 C-PROCESS
CHROM DET
PLAY AMP
ACC DET
ACC AMP
CHROM BPF
PLAY MESECAM ONLY
SEC
SSP
PULSE GENE
APC ID
1/N
APC DET
1/8
APC ID
ID OUT
ACK
VCO
B-ID DET.
PS
ID LOGIC
SW
APC DET.
VXO (XO)
X2
SUB CONV
SECAM
CARRI BPF
1.4M L.P.F
ACK
B-(DE) EMPH
MAIN CONV
R/P
PREPLAY +5V
REC COLOR SIGNAL
LPF TRAP
Q408
Q410
Q411
NTSC +B
C451
XO ADJ
Q409
ATT
4.43MHz CW (TO SF .v0)
TP211
Q404
Q308
PLAY C NTSC ONLY
Q311
Q310
IC306 SWITCH
4.43 NTSC
ON PAL TV
S202
PHASE SIFT
IC304 SWITCH
IC303
D-FF
+5V
IC302
Q307
D-FF

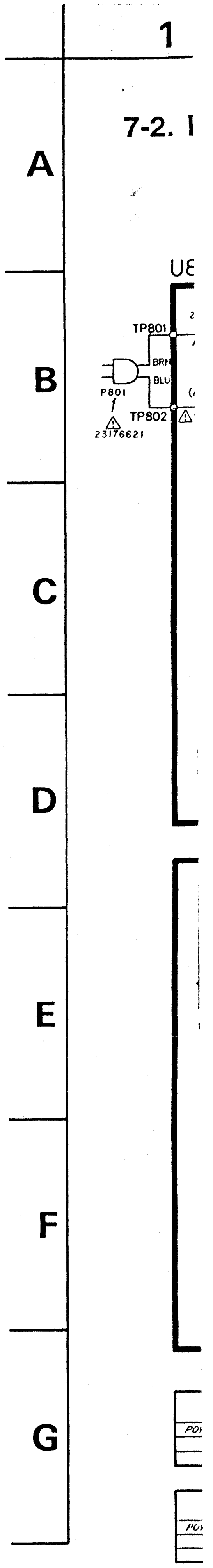
13-1. Audio Block Diagram

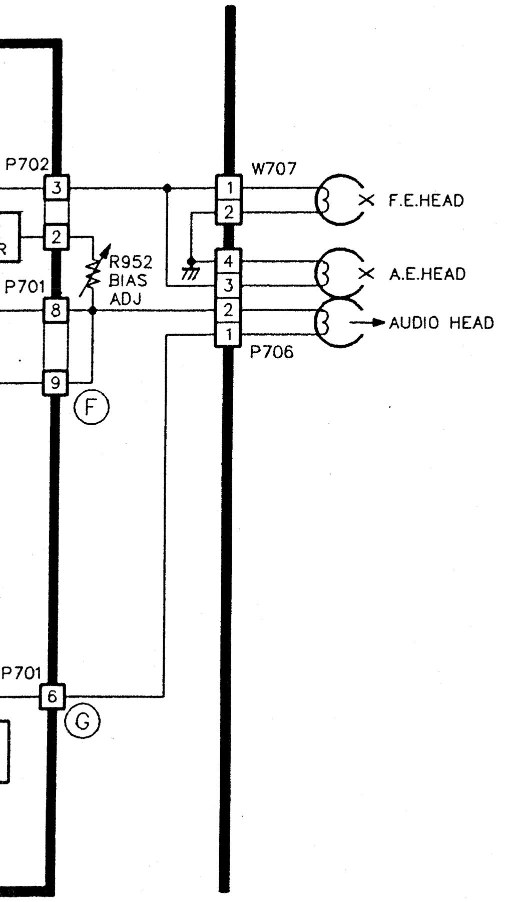

MAIN UNIT
U701 CONVENTIONAL AUDIO
IC701 BA7765AS REC PLAY AMP
P702
A.MUTE(Hi)
SP
REC MUTE(Hi)
Q731
P701
PB(Hi)
18
A.MUTE(Hi)
19
SP
25
REC MUTE
10
PB(Hi)
REC B
27
Q702
BIAS GENERATOR
O REC
32
PB EE
REC
20
24
D
ATT
P702
BUFF
MUTE
17
16
C
J
TO RF MOD
E K
ATT
LINE OUT
B
P701
ATT
LINE IN
11
ALC
EE,REC
LINE
14
I
9
PB
H
EQ
8
4
R751
PB LEVEL
ADJ
REC
EE
O PB
PLAY PEAKING (SP)
A
FROM SIF
P702
P701
P701
F
G
R952
BIAS
ADJ
W707
P706
F.E.HEAD
A.E.HEAD
AUDIO HEAD



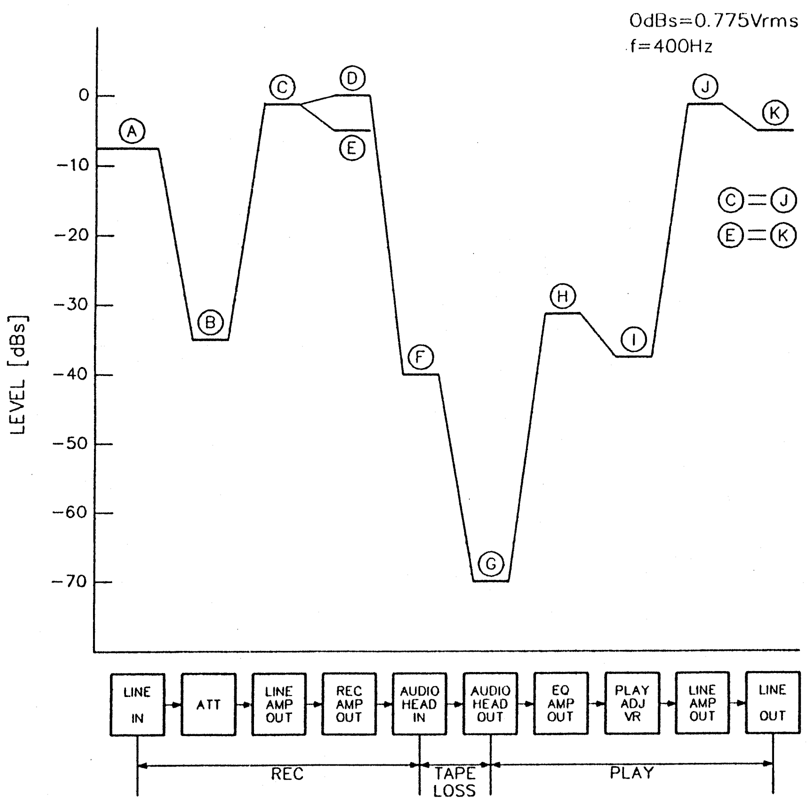
1

7-2. I

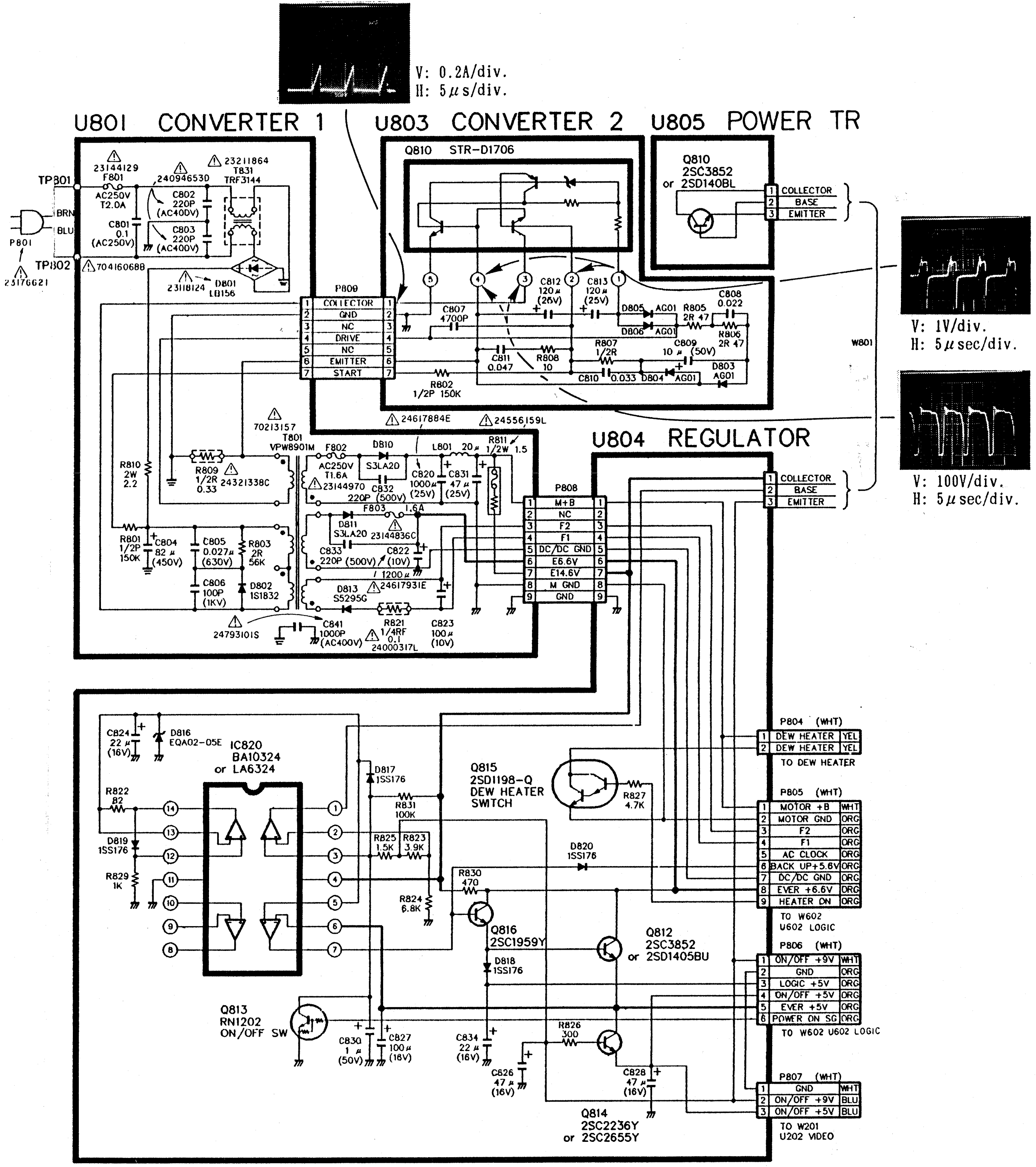

A
B
C
D
E
F
G
UE
TP801
P801
TP802
23176621
BRN
BLU



P702
W707
3
2
R952
BIAS
ADJ
P701
8
9
F
4
3
2
1
1
2
F.E.HEAD
A.E.HEAD
AUDIO HEAD
P706
P701
6
G



7-2. Power Supply Circuit



1
2
3
4
5
6
A
B
C
D
E
F
G
V: 0.2A/div.
H: 5μs/div.
U801 CONVERTER 1
U803 CONVERTER 2
U805 POWER TR
Q810 STR-D1706
Q810 2SC3852 or 2SD1406BL
COLLECTOR
BASE
EMITTER
V: 1V/div.
H: 5μsec/div.
V: 100V/div.
H: 5μsec/div.
W801
TP801
TP802
P801
BRN
BLU
23176621
23144129
F801
AC250V T2.0A
C801 0.1 (AC250V)
240946530
C802 220P (AC400V)
C803 220P (AC400V)
23211864
T831
TRF3144
704160688
23118124
D801
LU156
P809
COLLECTOR
GND
NC
DRIVE
NC
EMITTER
START
C807 4700P
C812 120μ (26V)
C813 120μ (25V)
C808 0.022
D805
AG01
R805 2R 47
D806
AG01
R806 2R 47
R807 1/2R
R808 10
C811 0.047
C809 10μ (50V)
C810 0.033
D804 AG01
D803 AG01
R802 1/2P 150K
70213157
T801
VPW8901M
24617884E
24556159L
U804 REGULATOR
R810 2W 2.2
R809 1/2R 0.33
24321338C
F802 AC250V T1.6A
23144970
D810 S3LA20
C832 220P (500V)
C820 1000μ (25V)
C831 47μ (25V)
L801 20μ
R811 1/2W 1.5
F803 1.6A
D811 S3LA20
23144836C
C833 220P (500V)
C822 1000μ (10V)
R801 1/2P 150K
C804 82μ (450V)
C805 0.027μ (630V)
R803 2R 56K
C806 100P (1KV)
D802 1S1832
D813 S5295G
24617931E
24793101S
C841 1000P (AC400V)
R821 1/4RF 0.1
24000317L
C823 100μ (10V)
P808
M+B
NC
F2
F1
DC/DC GND
E6.6V
E14.6V
M GND
GND
C824 22μ (16V)
D816 EQA02-05E
IC820 BA10324 or LA6324
D817 1SS176
R822 82
D819 1SS176
R829 1K
R831 100K
R825 1.5K
R823 3.9K
R824 6.8K
R830 470
Q815 2SD1198-Q DEW HEATER SWITCH
R827 4.7K
D820 1SS176
Q816 2SC1959Y
D818 1SS176
Q812 2SC3852 or 2SD1405BU
Q813 RN1202 ON/OFF SW
C830 1μ (50V)
C827 100μ (16V)
C834 22μ (16V)
C626 47μ (16V)
R826 300
C826 47μ (16V)
Q814 2SC2236Y or 2SC2655Y
P804 (WHT)
DEW HEATER YEL
DEW HEATER YEL
TO DEW HEATER
P805 (WHT)
MOTOR +B WHT
MOTOR GND ORG
F2 ORG
F1 ORG
AC CLOCK ORG
BACK UP+5.6V ORG
DC/DC GND ORG
EVER +6.6V ORG
HEATER ON ORG
TO W602 U602 LOGIC
P806 (WHT)
ON/OFF +9V WHT
GND ORG
LOGIC +5V ORG
ON/OFF +5V ORG
EVER +5V ORG
POWER ON SG ORG
TO W602 U602 LOGIC
P807 (WHT)
GND WHT
ON/OFF +9V BLU
ON/OFF +5V BLU
TO W201 U202 VIDEO

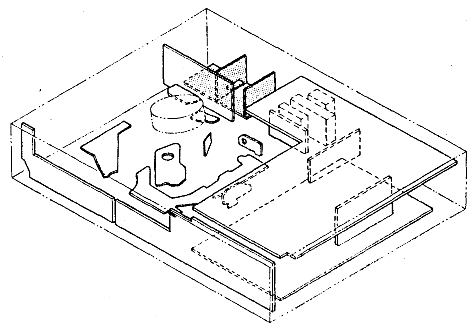
(V)

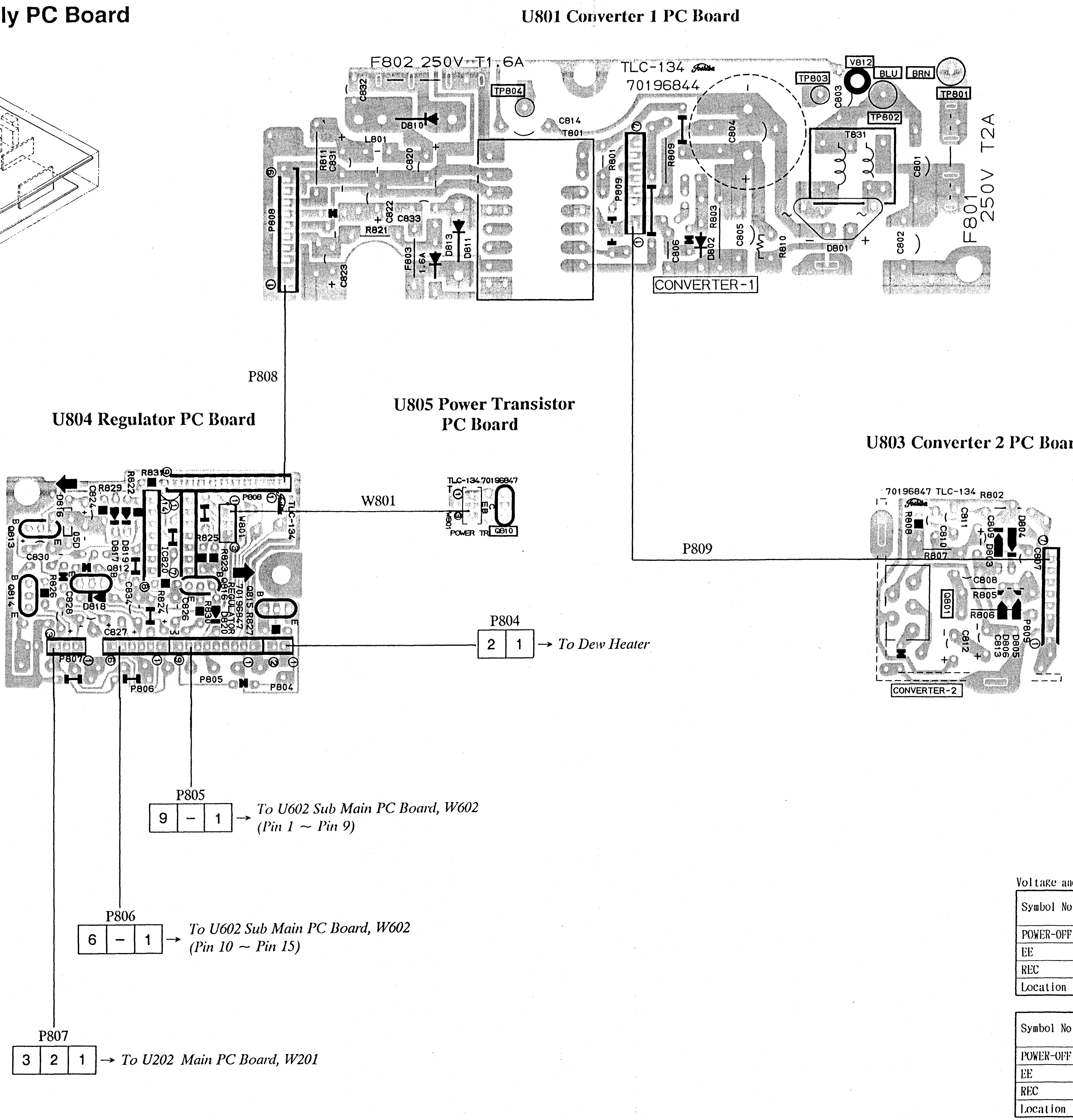
	IC820													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
POWER OFF	0	0	0	15.6	5.1	5.1	6.4	N.C.	N.C.	N.C.	0	5.1	5.1	5.7
EE	9.7	5.7	5.7	14.9	5.1	5.1	6.4	N.C.	N.C.	N.C.	0	5.1	5.1	5.7
REC	9.7	5.7	5.7	14.2	5.1	5.1	6.4	N.C.	N.C.	N.C.	0	5.1	5.1	5.7

(V)

	Q810			Q812			Q813			Q814			Q815			Q816			D818	D820
	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	K	K
POWER OFF	0	15.7	0	5.1	6.9	5.7	0	0	2.8	0	5.1	0	0	0.7	1.4	5.7	6.6	6.4	5.1	5.6
EE	9.0	14.9	9.7	5.1	6.6	5.7	0	5.7	0	5.0	5.1	5.7	0	15.3	0	5.7	6.4	6.4	5.1	5.6
REC	9.0	14.2	9.7	5.1	6.6	5.7	0	5.7	0	5.0	5.1	5.7	0	14.8	0	5.7	6.4	6.4	5.1	5.6

7-3. Power Supply PC Board




U801 Converter 1 PC Board
F802 250V T1.6A
TLC-134
70196844
TP804
TP803
V812
BLU
BRN
TP801
TP802
T801
T831
C814
D810
L801
CONVERTER-1
F801 250V T2A
D801
D802
D811
D813
F803 1.6A
P808
P809
U804 Regulator PC Board
U805 Power Transistor PC Board
TLC-134 70196847
POWER TR
Q810
W801
IC820
P804
P805
P806
P807
2 | 1 → To Dew Heater
P805
9 | – | 1 → To U602 Sub Main PC Board, W602 (Pin 1 ~ Pin 9)
P806
6 | – | 1 → To U602 Sub Main PC Board, W602 (Pin 10 ~ Pin 15)
P807
3 | 2 | 1 → To U202 Main PC Board, W201
U803 Converter 2 PC Board
70196847 TLC-134
Q801
CONVERTER-2

Location of IC

Symbol No.	Loca-tion
IC820	D-3
Q801	D-8

Location of Diodes

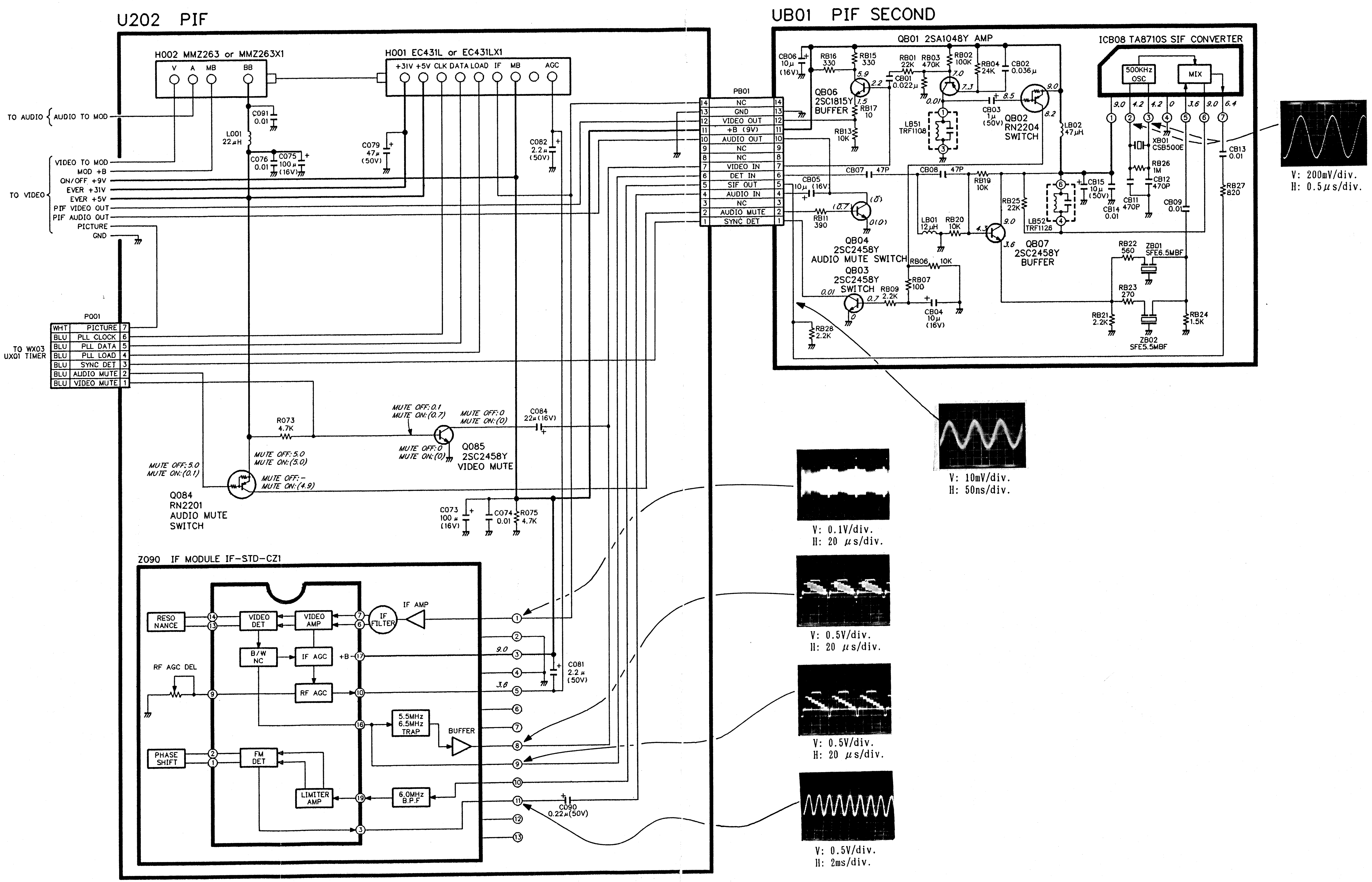
Symbol No.	Loca-tion
D801	B-7
D802	B-6
D803	D-8
D804	D-8
D805	E-8
D806	E-8
D810	A-4
D811	B-5
D813	B-5
D816	D-2
D817	D-3
D818	D-2
D819	D-3
D820	D-3

Voltage and Location of Transistors Unit:V

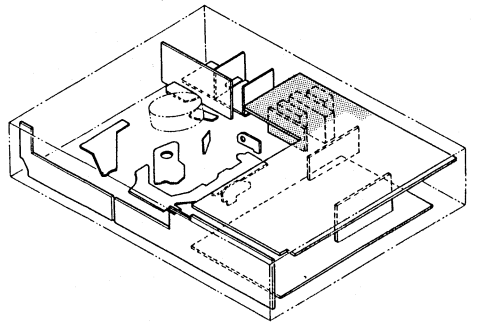
Symbol No.	Q810			Q812			Q813		
	E	C	B	E	C	B	E	C	B
POWER-OFF	0	15.7	0	5.1	6.9	5.7	0	0	2.8
EE	9.0	14.9	9.7	5.1	6.6	5.7	0	5.7	0
REC	9.0	14.2	9.7	5.1	6.6	5.7	0	5.7	0
Location	D-5			D-3			D-2		

Symbol No.	Q814			Q815			Q816		
	E	C	B	E	C	B	E	C	B
POWER-OFF	0	5.1	0	0	0.7	1.4	5.7	6.6	6.4
EE	5.0	5.1	5.7	0	15.3	0	5.7	6.4	6.4
REC	5.0	5.1	5.7	0	14.8	0	5.7	6.4	6.4
Location	D-2			D-3			D-3		

8-2. PIF Circuit


1 2 3 4 5 6 7 8 9 10 11
A B C D E F G
U202 PIF
H002 MMZ263 or MMZ263X1
H001 EC431L or EC431LX1
UB01 PIF SECOND
QB01 2SA1048Y AMP
ICB08 TA8710S SIF CONVERTER
500KHz OSC
MIX
PB01
NC
GND
VIDEO OUT
+B (9V)
AUDIO OUT
VIDEO IN
DET IN
SIF OUT
AUDIO IN
AUDIO MUTE
SYNC DET
TO AUDIO
AUDIO TO MOD
TO VIDEO
VIDEO TO MOD
MOD +B
ON/OFF +9V
EVER +31V
EVER +5V
PIF VIDEO OUT
PIF AUDIO OUT
PICTURE
GND
P001
PLL CLOCK
PLL DATA
PLL LOAD
SYNC DET
AUDIO MUTE
VIDEO MUTE
TO WX03 UX01 TIMER
QB06 2SC1815Y BUFFER
QB02 RN2204 SWITCH
QB04 2SC2458Y AUDIO MUTE SWITCH
QB03 2SC2458Y SWITCH
QB07 2SC2458Y BUFFER
LB51 TRF1108
LB52 TRF1126
XB01 CSB500E
ZB01 SFE6.5MBF
ZB02 SFE5.5MBF
Q085 2SC2458Y VIDEO MUTE
Q084 RN2201 AUDIO MUTE SWITCH
MUTE OFF: 0.1 MUTE ON: (0.7)
MUTE OFF: 0 MUTE ON: (0)
MUTE OFF: 5.0 MUTE ON: (0.1)
MUTE OFF: 5.0 MUTE ON: (5.0)
MUTE OFF: – MUTE ON: (4.9)
Z090 IF MODULE IF-STD-CZ1
RESO NANCE
VIDEO DET
VIDEO AMP
IF FILTER
IF AMP
B/W NC
IF AGC
RF AGC
RF AGC DEL
5.5MHz 6.5MHz TRAP
BUFFER
PHASE SHIFT
FM DET
LIMITER AMP
6.0MHz B.P.F
V: 200mV/div. H: 0.5μs/div.
V: 10mV/div. H: 50ns/div.
V: 0.1V/div. H: 20 μs/div.
V: 0.5V/div. H: 20 μs/div.
V: 0.5V/div. H: 20 μs/div.
V: 0.5V/div. H: 2ms/div.

8-3. PIF PC Board



Voltage and Location of Transistors V: REC (V): PLAY

Symbol No.		Voltage (Unit:V)			Location
		E	C	B	
Q084	MUTE OFF	5.0	——	5.0	E-8
	MUTE ON	(5.0)	(4.9)	(0.1)	
Q085	MUTE OFF	0	0	0.1	E-8
	MUTE ON	(0)	(0)	(0.7)	

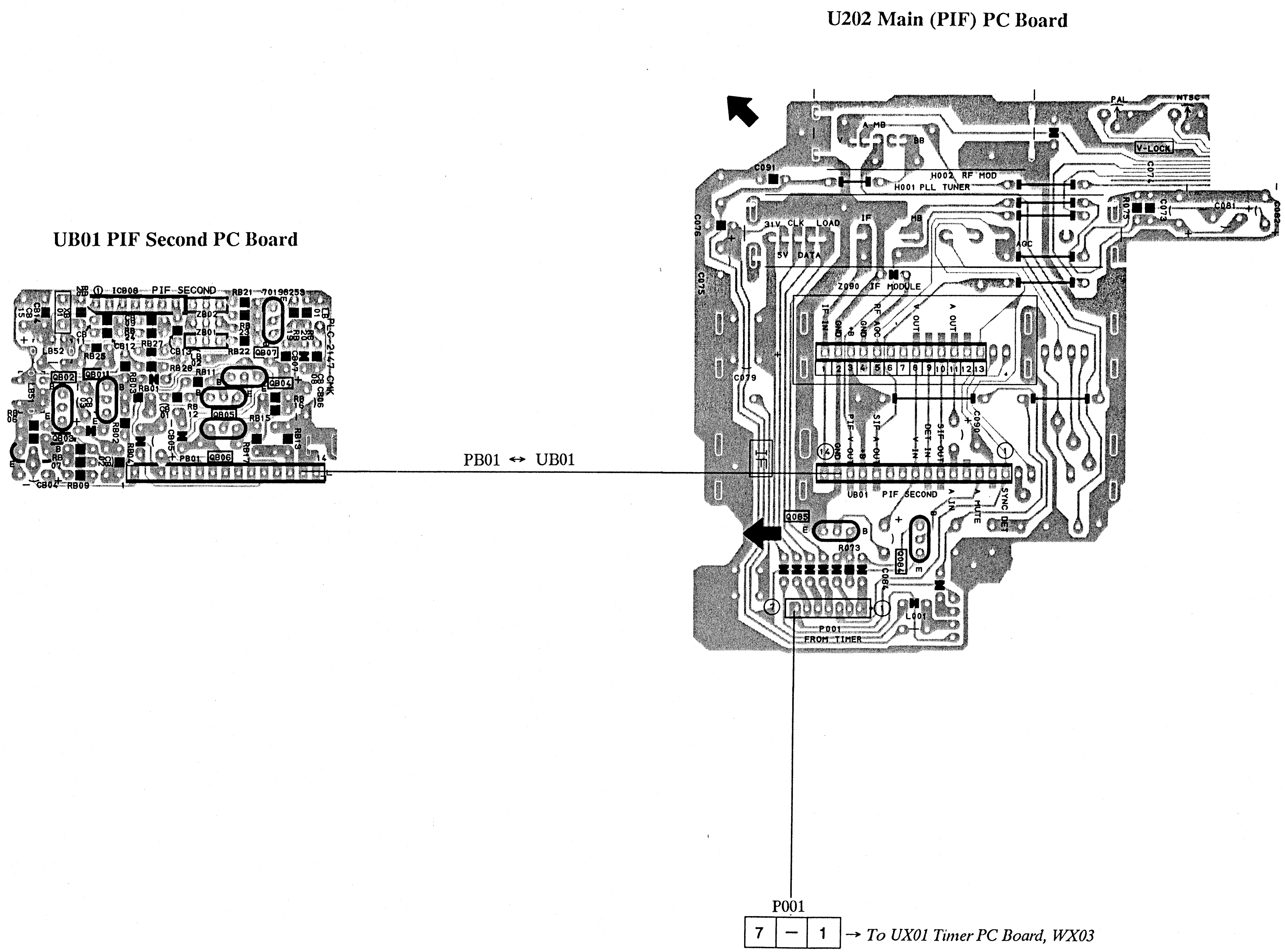
Voltage and Location of Transistors

V: REC (V): PLAY

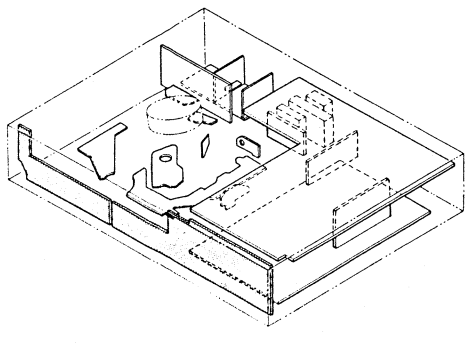
Symbol No.		Voltage (Unit:V)			Location
		E	C	B	
QB01		7.3	0.01	7.0	D-4
QB02		9.0	8.2	8.5	D-4
QB03		0	0.01	0.7	D-4
QB04	MUTE OFF	0(0)	——	——	D-5
	MUTE ON		(0)	(0.7)	
QB06		1.5	5.9	2.2	D-5
QB07		3.6	9.0	4.3	D-5

Location of IC

Symbol No.	Location
ICB08	C-4


U202 Main (PIF) PC Board
UB01 PIF Second PC Board
ICB08 PIF SECOND
QB01
QB02
QB04
QB05
QB06
QB07
PB01
PB01 ↔ UB01
H002 RF MOD
H001 PLL TUNER
Z090 IF MODULE
V-LOCK
PAL
NTSC
UB01 PIF SECOND
Q084
Q085
R073
L001
P001
FROM TIMER
P001
7 — 1
→ To UX01 Timer PC Board, WX03

9-2. Timer PC Board



Location of Adjusting VRs

Symbol No.	Location
R258	A-8
R556	A-7

Location of ICs

Symbol No.	Location
ICX01	F-8
ICX02	E-11
ICX10	E-7

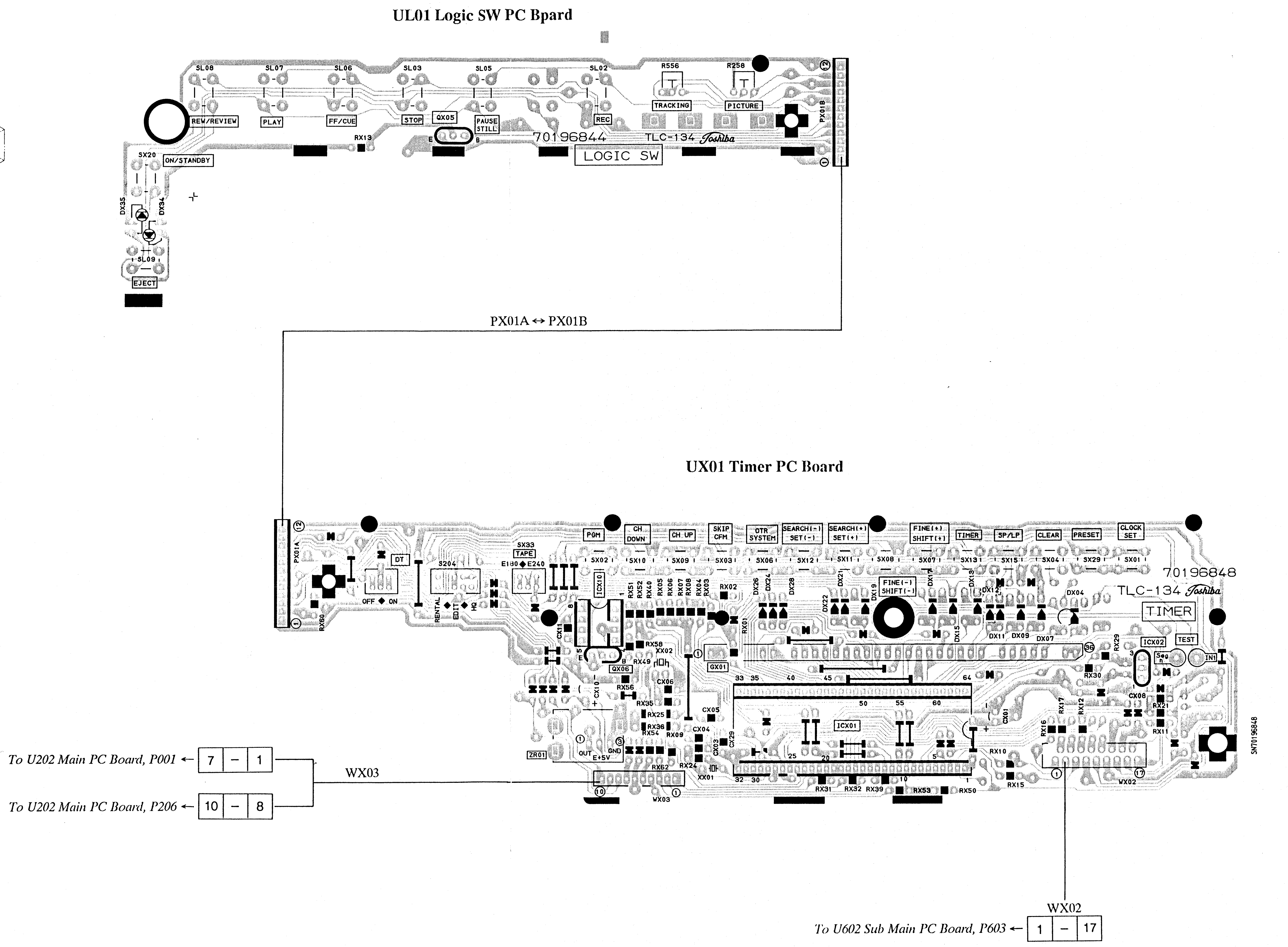
Location of Diodes

Symbol No.	Location
DX04	E-10
DX07	E-10
DX09	E-10
DX11	E-9
DX12*	E-9
DX13	E-9
DX15	E-9
DX17	E-9
DX19	E-9
DX21	E-8
DX22	E-8
DX24	E-8
DX26	E-8
DX28	E-8
DX34	B-4
DX35	B-3

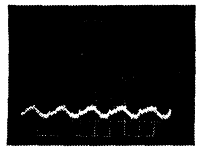
* : V-800SD/V-800SE

Voltage and Location of Transistors

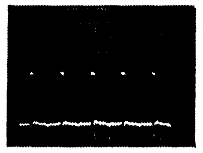
Symbol No.	Voltage (Unit:V)			Location
	E	C	B	
QX05	4.9	4.8	——	B-6
QX06	——	——	——	E-7


1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
UL01 Logic SW PC Bpard
SL08
SL07
SL06
SL03
SL05
SL02
R556
R258
TRACKING
PICTURE
REW/REVIEW
PLAY
FF/CUE
STOP
QX05
PAUSE STILL
REC
RX13
70196844
TLC-134 Toshiba
LOGIC SW
SX20
ON/STANDBY
DX35
DX34
SL09
EJECT
PX01B
PX01A ↔ PX01B
UX01 Timer PC Board
PX01A
RX50
DT
OFF ◆ ON
S204
RENTAL
EDIT
HQ
SX33
TAPE
E180 ◆ E240
ICX10
CX11
PGM
CH DOWN
CH UP
SKIP CFM
OTR SYSTEM
SEARCH(-) SET(-)
SEARCH(+) SET(+)
FINE(+) SHIFT(+)
FINE(-) SHIFT(-)
TIMER
SP/LP
CLEAR
PRESET
CLOCK SET
SX02
SX10
SX09
SX03
SX06
SX12
SX11
SX08
SX07
SX13
SX15
SX04
SX29
SX01
RX51
RX52
RX40
RX05
RX06
RX07
RX08
RX04
RX03
RX02
RX01
DX26
DX24
DX28
DX22
DX21
DX19
DX17
DX15
DX13
DX12
DX11
DX09
DX07
DX04
70196848
TLC-134 Toshiba
TIMER
ICX02
TEST
RX29
RX58
XX02
RX49
QX06
QX01
RX56
CX10
RX35
RX25
RX36
RX54
RX09
CX06
CX05
CX04
CX03
CX29
ICX01
CX01
CX08
RX30
RX21
RX11
RX17
RX12
RX16
RX10
RX15
ZR01
OUT
GND
E+5V
RX62
RX24
XX01
RX31
RX32
RX39
RX53
RX50
WX03
WX02
SN70196848
To U202 Main PC Board, P001 ←
7 – 1
To U202 Main PC Board, P206 ←
10 – 8
WX03
WX02
To U602 Sub Main PC Board, P603 ←
1 – 17

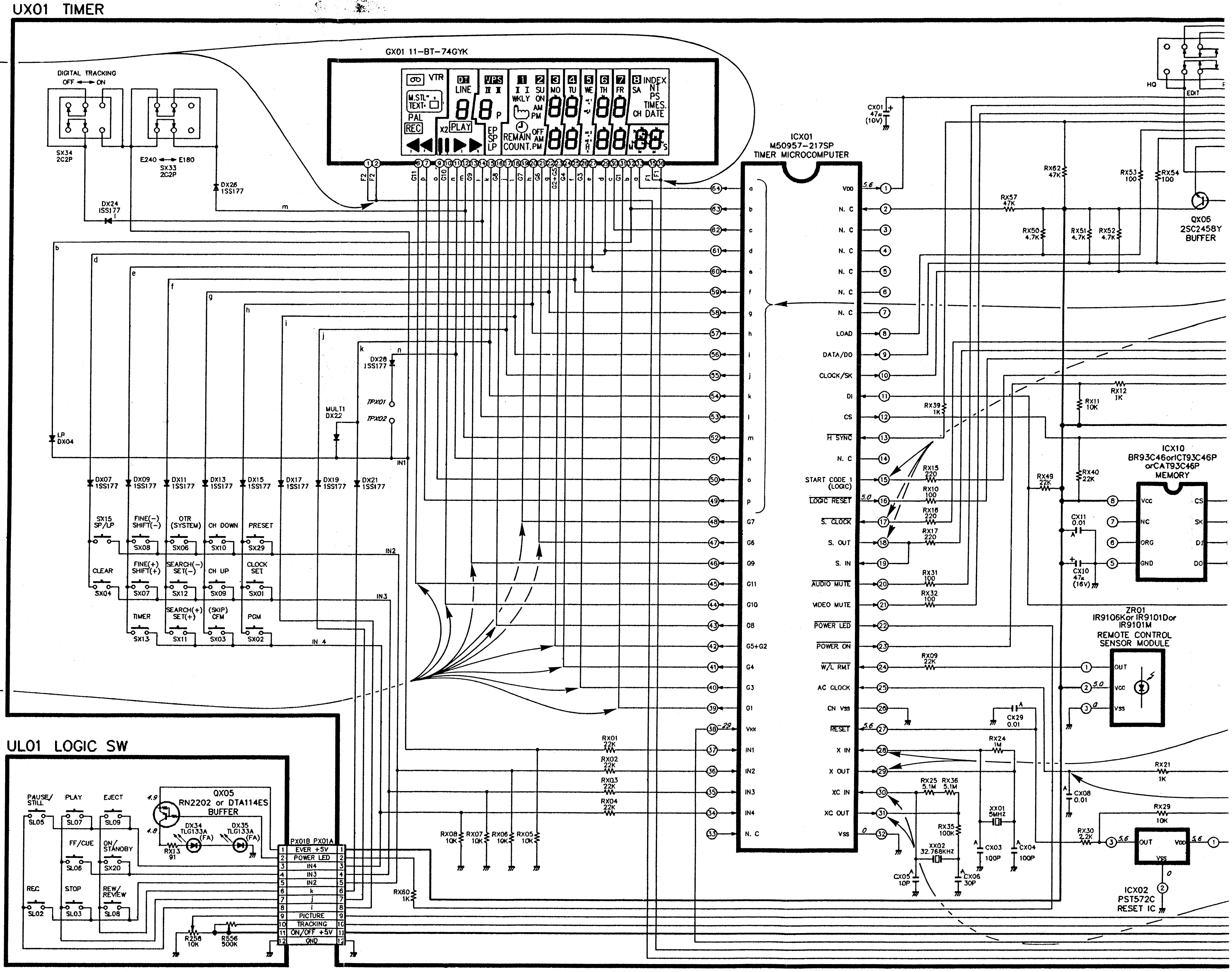
9-3. Timer Circuit

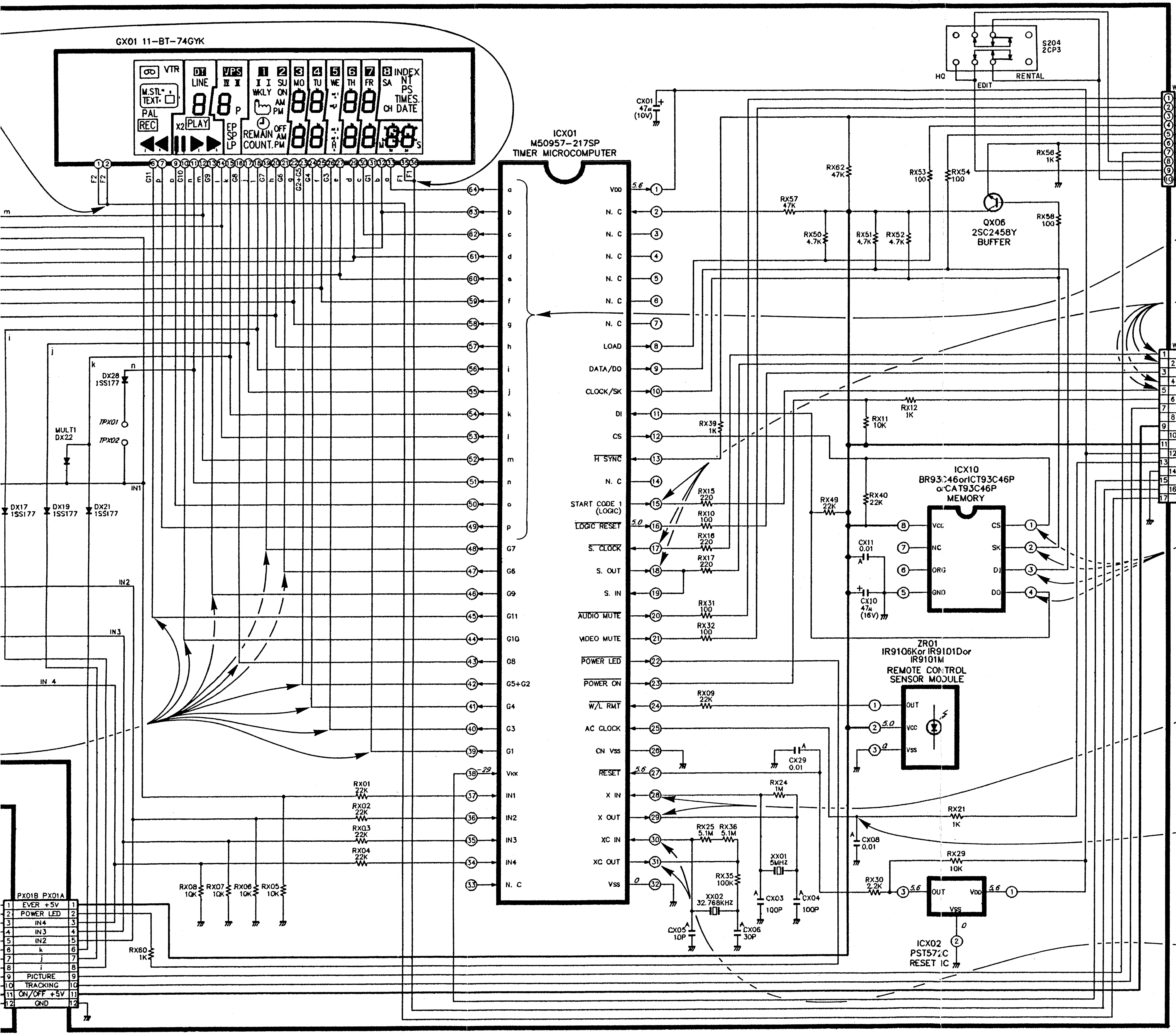


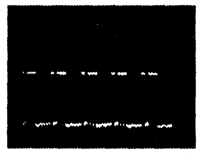
V: 10V/div.
H: 10ms/div.



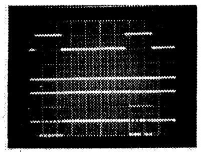
V: 10V/div.
H: 5ms/div.


UX01 TIMER
GX01 11-BT-74GYK
DIGITAL TRACKING OFF ◄► ON
SX34 2C2P
E240 ◄► E180
SX33 2C2P
DX26 1SS177
DX24 1SS177
DX28 1SS177
TPX01
TPX02
MULTI DX22
LP DX04
DX07 1SS177
DX09 1SS177
DX11 1SS177
DX13 1SS177
DX15 1SS177
DX17 1SS177
DX19 1SS177
DX21 1SS177
SX15 SP/LP
FINE(−) SHIFT(−) SX08
OTR (SYSTEM) SX06
CH DOWN SX10
PRESET SX29
CLEAR SX04
FINE(+) SHIFT(+) SX07
SEARCH(−) SET(−) SX12
CH UP SX09
CLOCK SET SX01
TIMER SX13
SEARCH(+) SET(+) SX11
(SKIP) CFM SX03
PGM SX02
IN1
IN2
IN3
IN 4
ICX01 M50957-217SP TIMER MICROCOMPUTER
VDD
N. C
LOAD
DATA/DO
CLOCK/SK
DI
CS
H SYNC
START CODE 1 (LOGIC)
LOGIC RESET
S. CLOCK
S. OUT
S. IN
AUDIO MUTE
VIDEO MUTE
POWER LED
POWER ON
W/L RMT
AC CLOCK
CN VSS
RESET
X IN
X OUT
XC IN
XC OUT
VSS
VKK
G7 G6 G9 G11 G10 G8 G5+G2 G4 G3 G1
RX01 22K
RX02 22K
RX03 22K
RX04 22K
RX08 10K
RX07 10K
RX06 10K
RX05 10K
RX80 1K
CX01 47µ (10V)
RX62 47K
RX57 47K
RX50 4.7K
RX51 4.7K
RX52 4.7K
RX53 100
RX54 100
QX06 2SC2458Y BUFFER
HQ
EDIT
RX11 10K
RX12 1K
RX39 1K
RX15 220
RX10 100
RX16 220
RX17 220
RX31 100
RX32 100
RX09 22K
RX49 22K
RX40 22K
CX11 0.01
CX10 47µ (16V)
ICX10 BR93C46orICT93C46P orCAT93C46P MEMORY
VCC NC ORG GND CS SK DI DO
ZR01 IR9106Kor IR9101Dor IR9101M REMOTE CONTROL SENSOR MODULE
OUT VCC VSS
CX29 0.01
RX24 1M
RX25 5.1M
RX36 5.1M
RX35 100K
XX01 5MHZ
XX02 32.768KHZ
CX03 100P
CX04 100P
CX05 10P
CX06 30P
CX08 0.01
RX21 1K
RX29 10K
RX30 2.2K
ICX02 PST572C RESET IC
UL01 LOGIC SW
PAUSE/ STILL SL05
PLAY SL07
EJECT SL09
FF/CUE SL06
ON/ STANDBY SX20
REC SL02
STOP SL03
REW/ REVIEW SL08
QX05 RN2202 or DTA114ES BUFFER
DX34 TLG133A (FA)
DX35 TLG133A (FA)
RX13 91
R258 10K
R556 500K
PX01B PX01A
1 EVER +5V
2 POWER LED
3 IN4
4 IN3
5 IN2
6 k
7 j
8 i
9 PICTURE
10 TRACKING
11 ON/OFF +5V
12 GND


GX01 11-BT-74GYK
VTR
DT LINE
VPS
INDEX NT PS TIMES. DATE
SA SU MO TU WE TH FR
WKLY ON AM PM
M.STL TEXT
PAL
REC
X2 PLAY
EP SP LP
REMAIN COUNT. PM
OFF AM
ICX01
M50957-217SP
TIMER MICROCOMPUTER
VDD
N. C
LOAD
DATA/DO
CLOCK/SK
DI
CS
H SYNC
START CODE 1 (LOGIC)
LOGIC RESET
S. CLOCK
S. OUT
S. IN
AUDIO MUTE
VIDEO MUTE
POWER LED
POWER ON
W/L RMT
AC CLOCK
CN VSS
RESET
X IN
X OUT
XC IN
XC OUT
VSS
VKK
IN1
IN2
IN3
IN4
G7 G6 G9 G11 G10 G8 G5+G2 G4 G3 G1
CX01 47μ (10V)
RX62 47K
RX57 47K
RX50 4.7K
RX51 4.7K
RX52 4.7K
RX53 100
RX54 100
RX56 1K
RX58 100
QX06 2SC2458Y BUFFER
S204 2CP3
HQ
EDIT
RENTAL
WX03
AUDIO MUTE
VIDEO MUTE
SYNC DET
PLL LOAD
PLL DATA
PLL CLOCK
PICTURE
EDIT
RENTAL
VIDEO +5V
TO P202 U202 VIDEO
WX02
S. CLOCK
S. DATA
LOGIC RESET
N. C
ST. CODE 1
POWER ON
TRACKING
N. C
ON/OFF +5V
N. C
EVER +5V
BACK UP +5.6V
AC CLOCK
GND
VKK
F1
F2
TO P603 U602 LOGIC
RX39 1K
RX11 10K
RX12 1K
RX15 220
RX10 100
RX16 220
RX17 220
RX31 100
RX32 100
RX09 22K
RX49 22K
RX40 22K
ICX10
BR93C46 or CT93C46P or CAT93C46P
MEMORY
VCC NC ORG GND CS SK DI DO
CX11 0.01
CX10 47μ (16V)
ZR01
IR9106K or IR9101D or IR9101M
REMOTE CONTROL SENSOR MODULE
OUT VCC VSS
CX29 0.01
RX24 1M
RX21 1K
CX08 0.01
RX25 5.1M
RX36 5.1M
RX35 100K
XX01 5MHZ
XX02 32.768KHZ
CX03 100P
CX04 100P
CX05 10P
CX06 30P
RX29 10K
RX30 2.2K
ICX02 PST572C RESET IC
RX01 22K
RX02 22K
RX03 22K
RX04 22K
RX08 10K
RX07 10K
RX06 10K
RX05 10K
RX60 1K
DX28 1SS177
TPX01
TPX02
MULTI DX22
DX17 1SS177
DX19 1SS177
DX21 1SS177
PX01B PX01A
EVER +5V
POWER LED
IN4
IN3
IN2
k
j
i
PICTURE
TRACKING
ON/OFF +5V
GND
5.6
5.0
-29
0

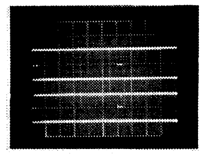


V: 10V/div.
H: 5ms/div.



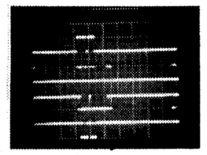
V: 5V/div.
H: 10ms/div.

(POWER ON-STOP)

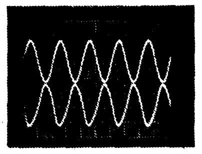


V: 5V/div.
H: 5ms/div.

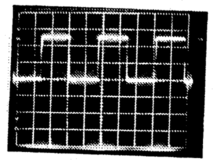
(CH UP)



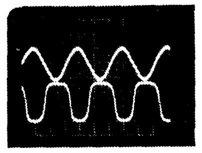
V: 5V/div.
H: 5ms/div.



V: 2V/div.
H: 0.1μs/div.

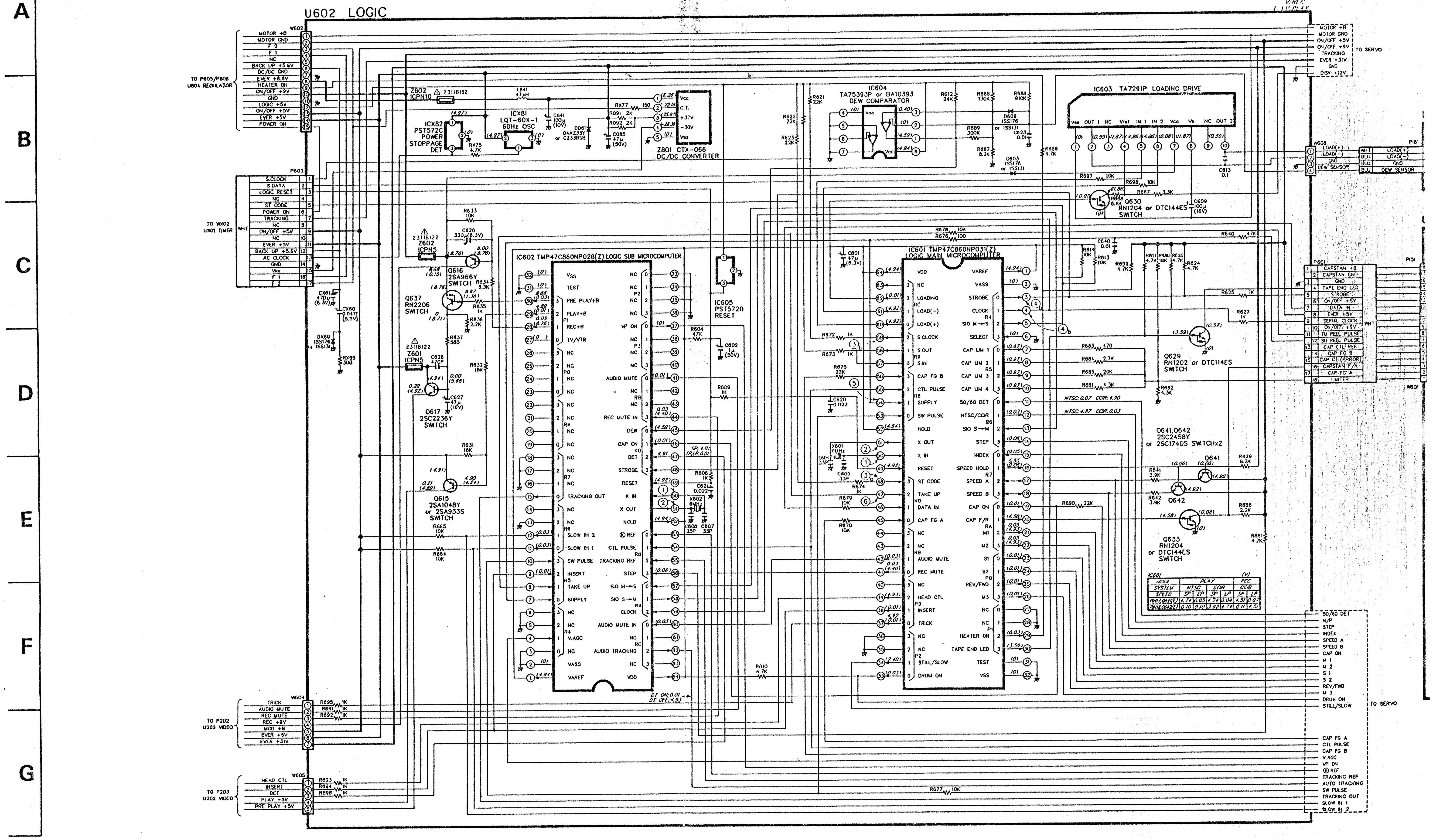


V: 2V/div.
H: 5ms/div.



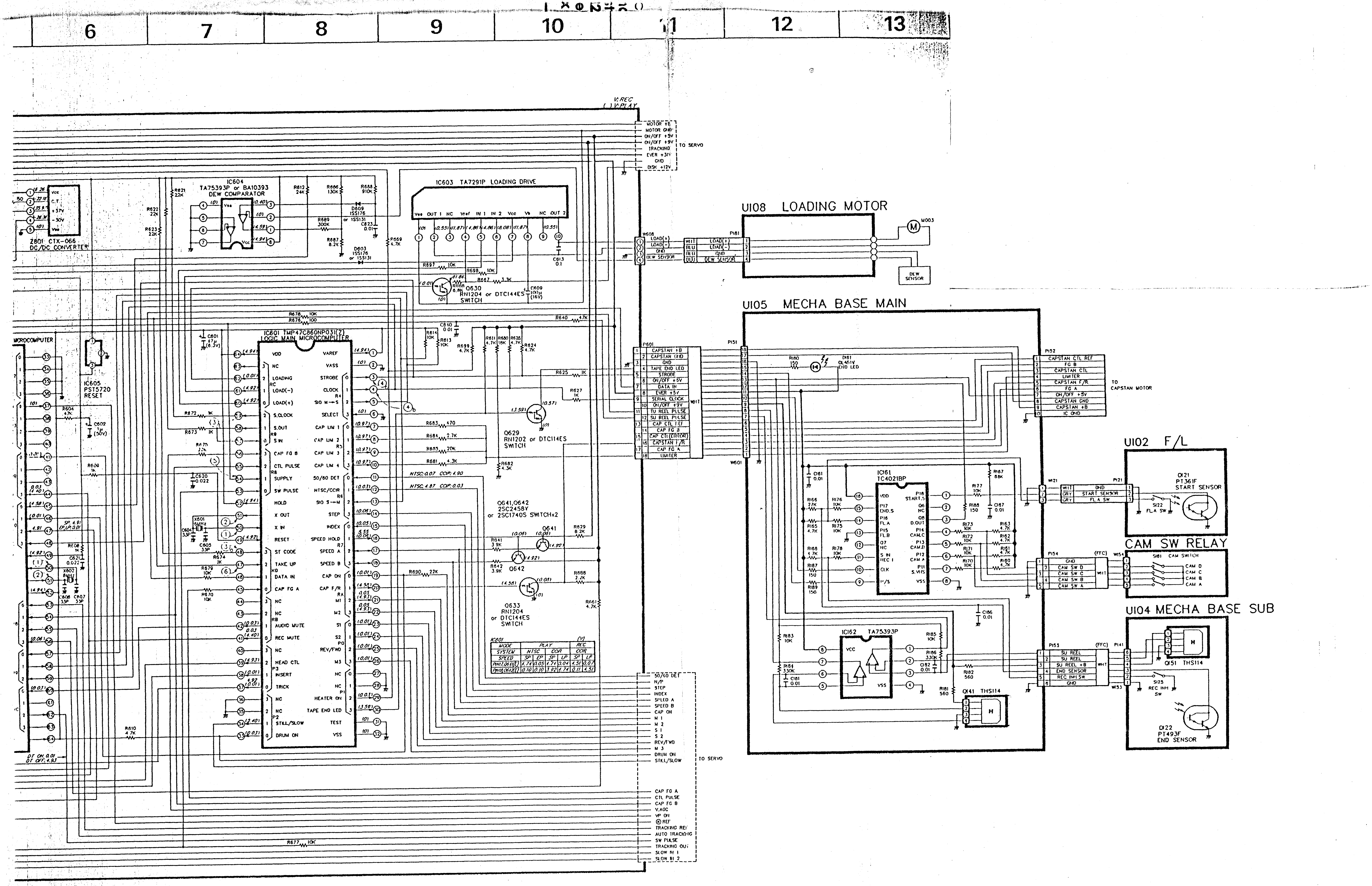
V: 2V/div.
H: 10 μs/div.

10-2. Logic Circuit

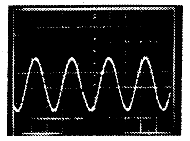

U602 LOGIC
W602
MOTOR +B
MOTOR GND
F 2
F 1
NC
BACK UP +5.6V
DC/DC GND
EVER +6.8V
HEATER ON
ON/OFF +9V
GND
LOGIC +5V
ON/OFF +5V
EVER +5V
POWER ON
TO P805/P806 U804 REGULATOR
P603
S.CLOCK
S.DATA
LOGIC RESET
NC
ST CODE
POWER ON
TRACKING
NC
ON/OFF +5V
NC
EVER +5V
BACK UP +5.6V
AC CLOCK
GND
Vkk
F 1
F 2
TO WX02 UX01 TIMER
WHT
Z802 ICPN10 23118132
ICX82 PST572C POWER STOPPAGE DET
ICX81 LQT-60X-1 60Hz OSC
L841 47μH
C841 100μ (10V)
D081 04AZ33Y or CZ33BSB
C085 47μ (50V)
RX77 150
R091 2K
R092 2K
Z801 CTX-066 DC/DC CONVERTER
IC604 TA75393P or BA10393 DEW COMPARATOR
IC603 TA7291P LOADING DRIVE
D609 1SS176 or 1SS131
D603 1SS176 or 1SS131
C823 0.01
R612 24K
R686 130K
R688 910K
R689 300K
R687 8.2K
R669 4.7K
R621 22K
R622 22K
R623 22K
C613 0.1
Q630 RN1204 or DTC144ES SWITCH
C609 100μ (16V)
W608
LOAD(+)
LOAD(-)
GND
DEW SENSOR
P181
WHT
BLU
MOTOR +B
MOTOR GND
ON/OFF +5V
ON/OFF +9V
TRACKING
EVER +31V
GND
DISK +12V
TO SERVO
V.REC
V.PLAY
Z602 ICPN5 23118122
Q616 2SA966Y SWITCH
Q637 RN2206 SWITCH
Z601 ICPN5 23118122
Q617 2SC2236Y SWITCH
Q615 2SA1048Y or 2SA933S SWITCH
CX61 470μ (6.3V)
CX60 0.047F (5.5V)
DX60 1SS176 or 1SS131
RX69 300
IC602 TMP47C860NP028(Z) LOGIC SUB MICROCOMPUTER
IC605 PST5720 RESET
C602 1μ (50V)
IC601 TMP47C860NP031(Z) LOGIC MAIN MICROCOMPUTER
X601 4MHz
X602 8MHz
P601
CAPSTAN +B
CAPSTAN GND
GND
TAPE END LED
STROBE
ON/OFF +5V
DATA IN
EVER +5V
SERIAL CLOCK
ON/OFF +5V
TU REEL PULSE
SU REEL PULSE
CAP CTL REF
CAP FG B
CAP CTL(ERROR)
CAPSTAN F/R
CAP FG A
LIMITER
P151
W601
Q629 RN1202 or DTC114ES SWITCH
Q641,Q642 2SC2458Y or 2SC1740S SWITCHx2
Q633 RN1204 or DTC144ES SWITCH
W604
TRICK
AUDIO MUTE
REC MUTE
REC +9V
MOD +B
EVER +5V
EVER +31V
TO P202 U202 VIDEO
W605
HEAD CTL
INSERT
DET
PLAY +5V
PRE PLAY +5V
TO P203 U202 VIDEO
50/60 DET
N/P
STEP
INDEX
SPEED A
SPEED B
CAP ON
M 1
M 2
S 1
S 2
REV/FWD
M 3
DRUM ON
STILL/SLOW
CAP FG A
CTL PULSE
CAP FG B
V.AGC
VP ON
Ⓢ REF
TRACKING REF
AUTO TRACKING
SW PULSE
TRACKING OUT
SLOW fH 1
SLOW fH 2
DT ON: 0.01
DT OFF: 4.93
R677 10K

IC601 (V)

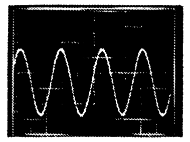
MODE	PLAY				REC	
SYSTEM	NTSC		CCIR		CCIR	
SPEED	SP	LP	SP	LP	SP	LP
PIN17,Q641(E)	4.74	0.05	4.74	0.04	4.51	0.07
PIN18,Q642(E)	0.10	0.10	3.92	4.74	0.11	4.51


6
7
8
9
10
11
12
13
Z801 CTX-066 DC/DC CONVERTER
IC604 TA75393P or BA10393 DEW COMPARATOR
IC603 TA7291P LOADING DRIVE
Q630 RN1204 or DTC144ES SWITCH
IC601 TMP47C860NP031(Z) LOGIC MAIN MICROCOMPUTER
IC605 PST5720 RESET
Q629 RN1202 or DTC114ES SWITCH
Q641,Q642 2SC2458Y or 2SC1740S SWITCH×2
Q633 RN1204 or DTC144ES SWITCH
TO SERVO
U108 LOADING MOTOR
M003
DEW SENSOR
U105 MECHA BASE MAIN
D181 OL451Y END LED
IC161 TC4021BP
IC162 TA75393P
Q141 THS114
TO CAPSTAN MOTOR
U102 F/L
Q121 PT361F START SENSOR
S122 FL.A SW
CAM SW RELAY
S161 CAM SWITCH
U104 MECHA BASE SUB
Q151 THS114
S125 REC INH SW
Q122 PT493F END SENSOR
MOTOR +B
MOTOR GND
ON/OFF +5V
ON/OFF +9V
TRACKING
EVER +31V
GND
DISK +12V
LOAD(+)
LOAD(-)
GND
DEW SENSOR
CAPSTAN +B
CAPSTAN GND
TAPE END LED
STROBE
ON/OFF +5V
DATA IN
EVER +5V
SERIAL CLOCK
ON/OFF +9V
TU REEL PULSE
SU REEL PULSE
CAP CTL REF
CAP FG B
CAP CTL (ERROR)
CAPSTAN F/R
CAP FG A
LIMITER
CAPSTAN CTL REF
FG B
CAPSTAN CTL
LIMITER
CAPSTAN F/R
FG A
ON/OFF +5V
CAPSTAN GND
CAPSTAN +B
IC GND
START SENSOR
FL A SW
CAM SW D
CAM SW C
CAM SW B
CAM SW A
SU REEL
SU REEL +B
END SENSOR
REC INH SW
50/60 DET
N/P
STEP
INDEX
SPEED A
SPEED B
CAP ON
M 1
M 2
S 1
S 2
REV/FWD
M 3
DRUM ON
STILL/SLOW
CAP FG A
CTL PULSE
CAP FG B
V.AGC
VP ON
REF
TRACKING REF
AUTO TRACKING
SW PULSE
TRACKING OUT
SLOW M 1
SLOW M 2

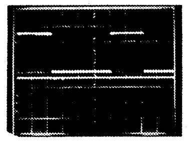
① IC601, Pin (50) E-7
IC602, Pin (50) E-6


(EE)
V: 1V/div.
H: 50 μs/div.

② IC601, Pin (51) D-7
IC602, Pin (51) E-6

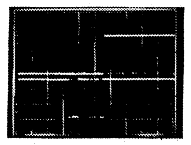

(EE)
V: 1V/div.
H: 50 μs/div.

③ a: IC601, Pin (48) E-7
b: IC601, Pin (59) D-7



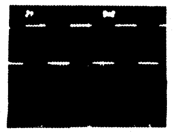
(EE)
V: 2V/div.
H: 5ms/div.

④ a: IC601, Pin ③ C-9
b: IC601, Pin ④ D-9

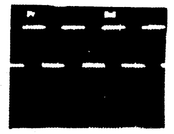


(EE)
V: 2V/div.
H: 0.5ms/div.

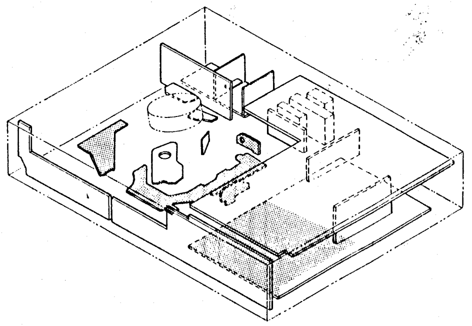
⑤ IC601, Pin (54) D-7


V: 2V/div.
H: 5ms/div.

⑥ IC601, Pin (47) E-7

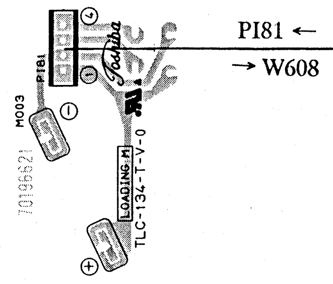

V: 2V/div.
H: 5ms/div.

10-3. Logic PC Board

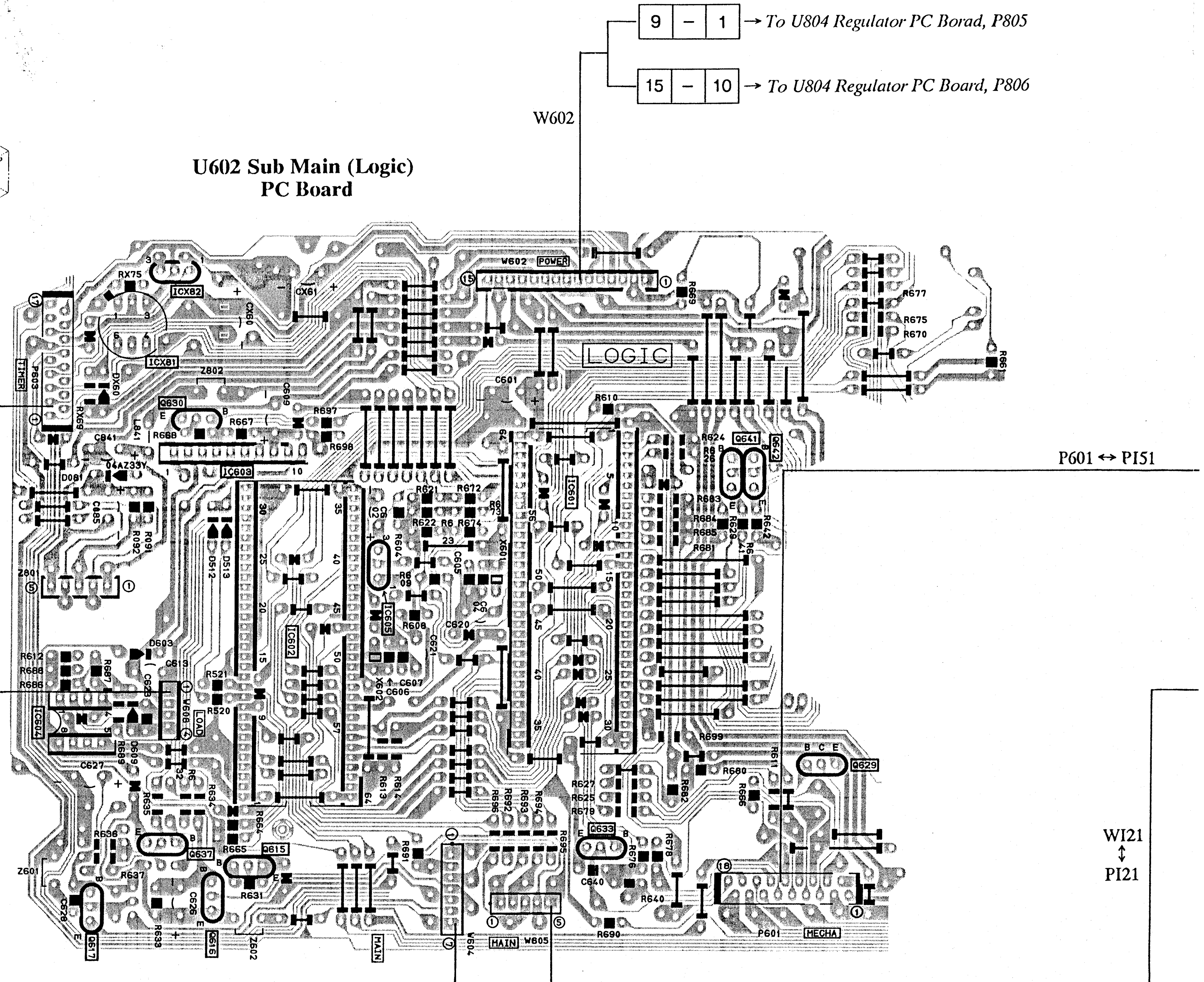


P603
17
1
1
To UX01 Timer PC Board, WX02

UI08 Loading Motor PC Board

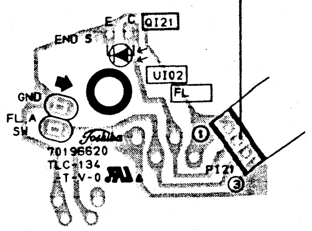

PI81 ←
→ W608
PI81
M003
TLC-134-T-V-0
LOADING M
70196621

U602 Sub Main (Logic) PC Board


9 - 1 → To U804 Regulator PC Borad, P805
15 - 10 → To U804 Regulator PC Board, P806
W602
P601 ↔ PI51
WI21
↕
PI21
LOGIC
W602 POWER
TIMER
P603
ICX82
ICX81
IC609
IC603
IC602
IC605
IC601
IC604
Q630
Q641
Q642
Q629
Q633
Q637
Q615
Q617
Q616
LOAD
W606
MAIN
W805
W604
MECHA
P601
Z601
Z602
Z801
Z802
04AZ33Y

W605
1 - 5 → *To U202 Main PC Board, P203*

W604
1
1
7
→ *To U202 Main PC Board, P202*


Q121
UI02
FL
END S
GND
FL
SW
70196620
TLC-134
T-V-0
PI21

UI02 F/L PC Board

Location of Transistors V: REC (V): PLAY

Symbol No.	Voltage (Unit: V)			Location
	E	C	B	
Q615	4.91	0.21(4.89)	4.90(4.24)	E-4
Q616	(8.76)	8.68(0.15)	8.0(8.76)	F-3
Q617	0.22(4.92)	(4.94)	0(5.66)	F-3
Q629	(0)	(0.57)	(3.59)	E-7
Q630	(0)	(11.86)	(0.01)	C-3
Q633	(0)	(0.08)	(4.58)	E-5
Q637	(8.76)	0(8.71)	8.67(1.36)	E-3
Q641	——	(4.92)	(0.06)	C-6
Q642	——	(4.92)	(0.06)	C-6
Q121	——	——	——	F-8
Q122	——	——	——	A-13
Q141	——	——	——	F-11
Q151	——	——	——	B-12

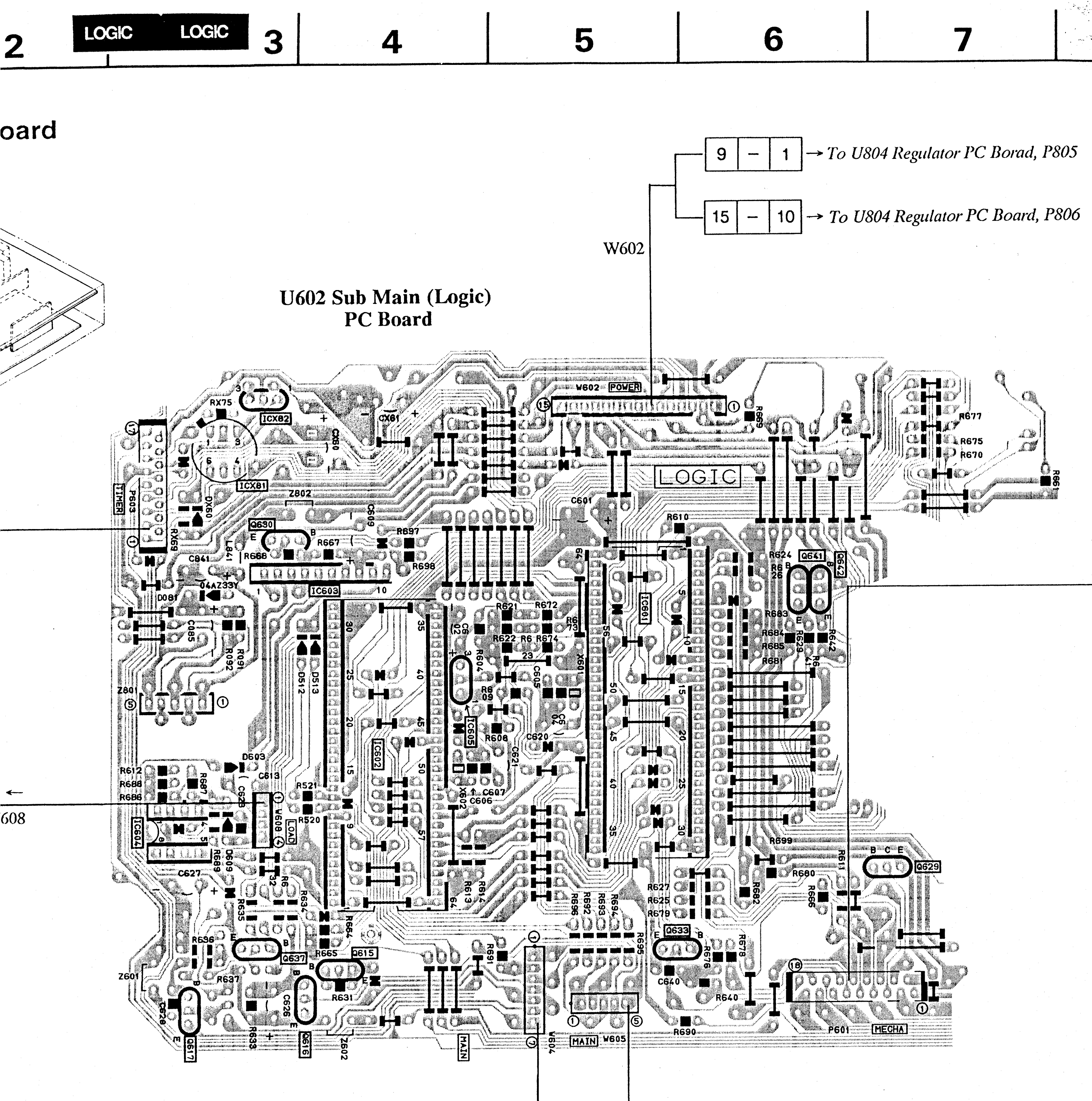
Location of ICs

Symbol No.	Location
IC601	C-5
IC602	D-4
IC603	C-4
IC604	D-3
IC605	D-4
IC161	F-12
IC162	F-12
ICX81	C-3
ICX82	B-3

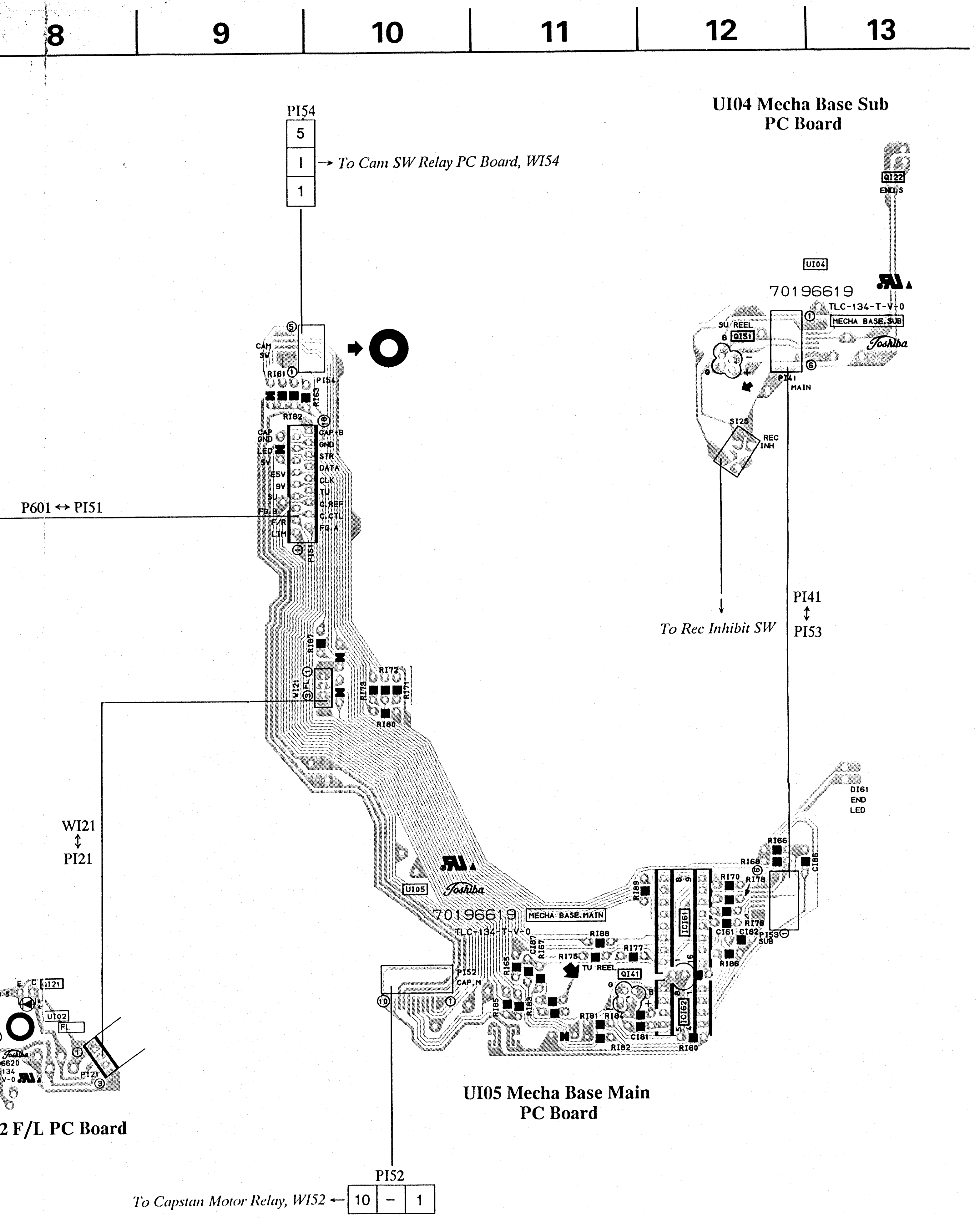
Location of Diodes

Symbol No.	Location
D081	C-3
D512	D-3
D513	D-4
D603	D-3
D609	E-3
D161	E-13
DX60	C-3

oard


2
LOGIC
LOGIC
3
4
5
6
7
8
W602
9 – 1 → To U804 Regulator PC Borad, P805
15 – 10 → To U804 Regulator PC Board, P806
U602 Sub Main (Logic) PC Board
LOGIC
POWER
TIMER
MAIN
MECHA
P601
P603
IC601
IC602
IC603
IC604
IC605
ICX81
ICX82
608

W605
1 – 5 → To U202 Main PC Board, P203
W604
1
|
7
→ To U202 Main PC Board, P202


9
10
11
12
13
PI54
5
|
1
→ To Cam SW Relay PC Board, WI54
P601 ↔ PI51
UI04 Mecha Base Sub PC Board
70196619
TLC-134-T-V-0
MECHA BASE.SUB
Toshiba
SU REEL
REC INH
MAIN
To Rec Inhibit SW
PI41
↕
PI53
CAM SW
CAP GND
LED
5V
E5V
9V
SU
FG.B
F/R
LIM
CAP+B
GND
STR
DATA
CLK
TU
C.REF
C.CTL
FG.A
WI21
↕
PI21
UI02 F/L PC Board
END S
GND
FL A SW
FL
UI05 Mecha Base Main PC Board
70196619
TLC-134-T-V-0
MECHA BASE.MAIN
Toshiba
DI61 END LED
CAP.M
TU REEL
PI52
To Capstan Motor Relay, WI52 ← 10 – 1

): PLAY

t: V)	Location
B	
4.90(4.24)	E-4
8.0(8.76)	F-3
0(5.66)	F-3
(3.59)	E-7
(0.01)	C-3
(4.58)	E-5
8.67(1.36)	E-3
(0.06)	C-6
(0.06)	C-6
——	F-8
——	A-13
——	F-11
——	B-12

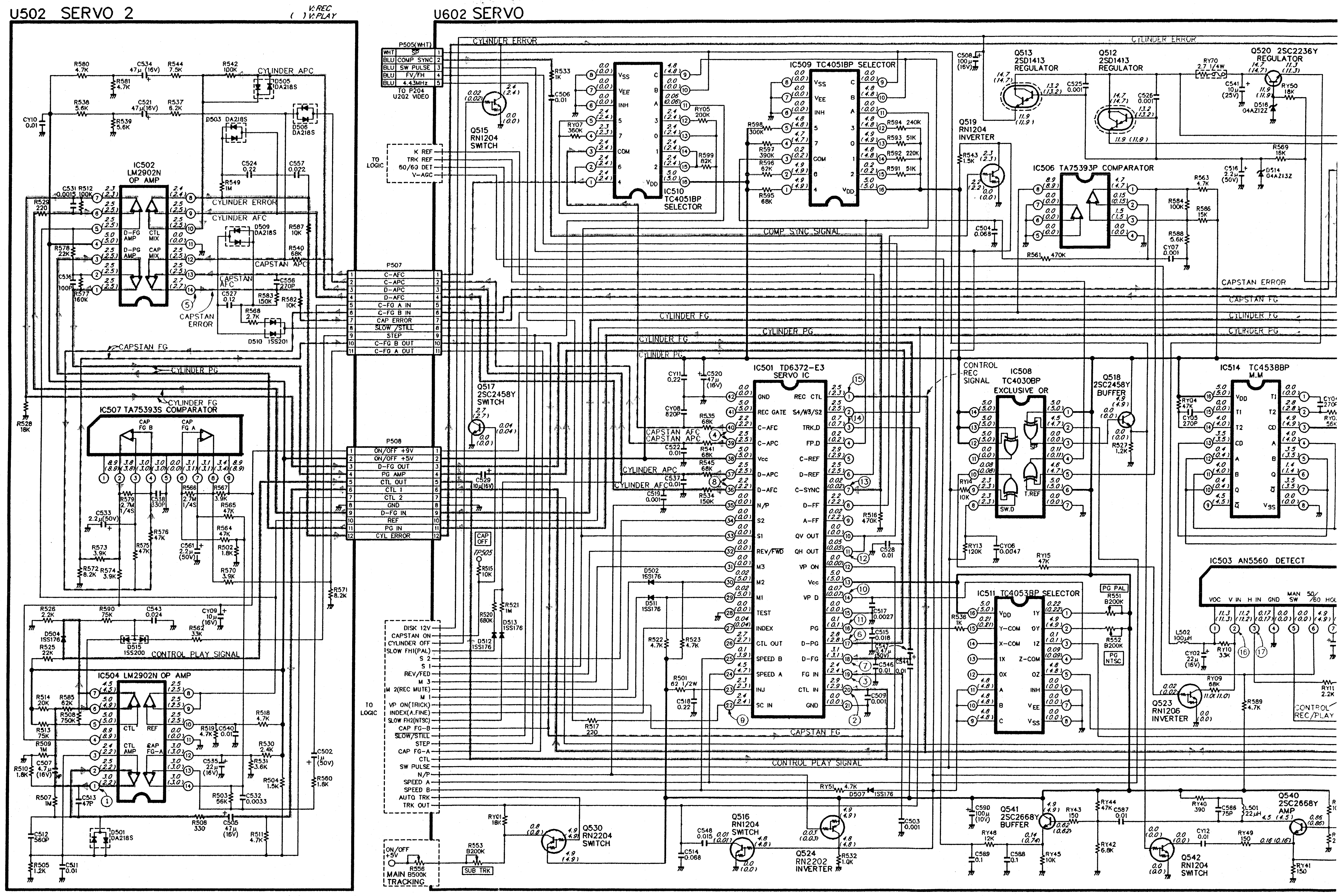
Location of ICs

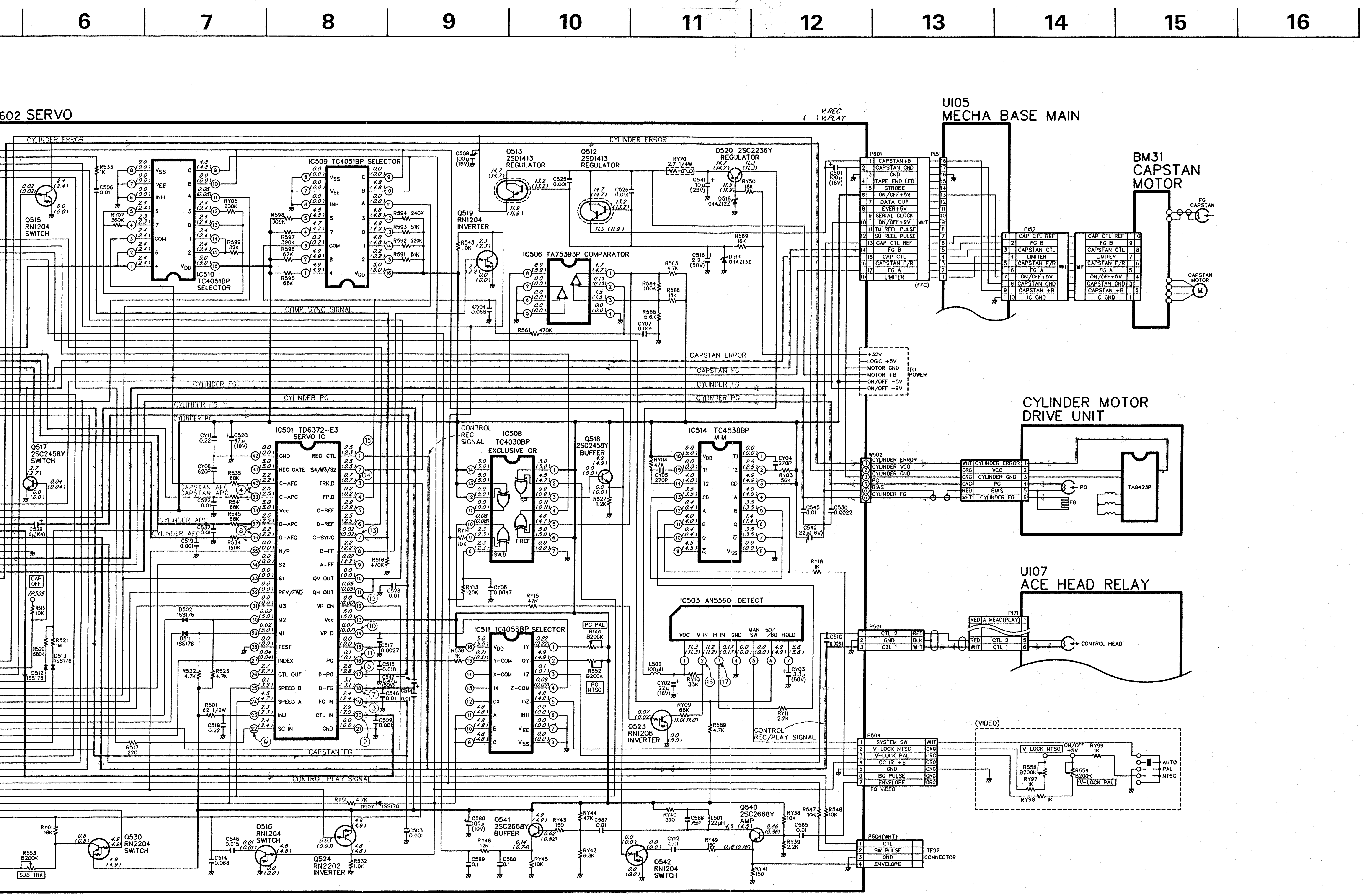
Symbol No.	Location
IC601	C-5
IC602	D-4
IC603	C-4
IC604	D-3
IC605	D-4
IC161	F-12
IC162	F-12
ICX81	C-3
ICX82	B-3

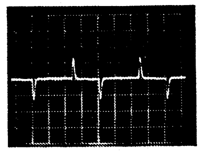
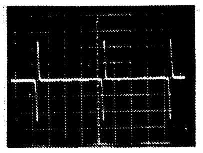
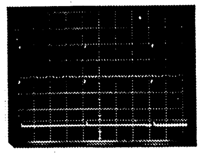
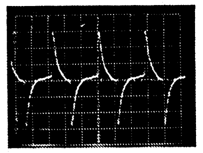
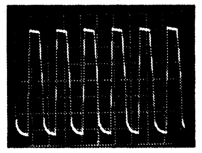
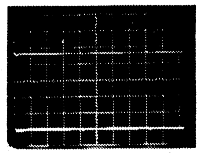
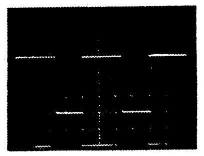
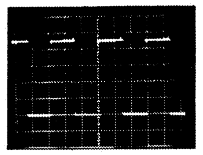
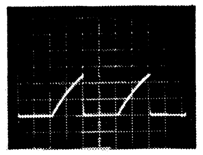
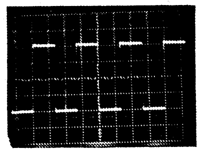
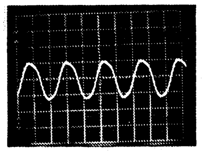
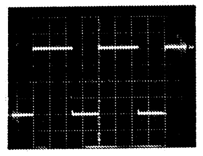
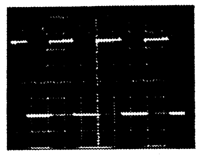
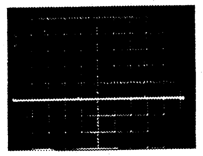
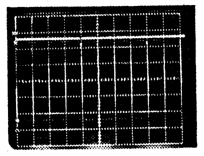
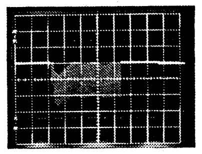
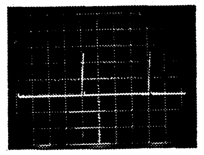
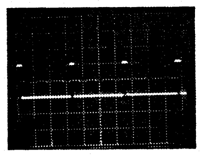
Location of Diodes

Symbol No.	Location
D081	C-3
D512	D-3
D513	D-4
D603	D-3
D609	E-3
D161	E-13
DX60	C-3

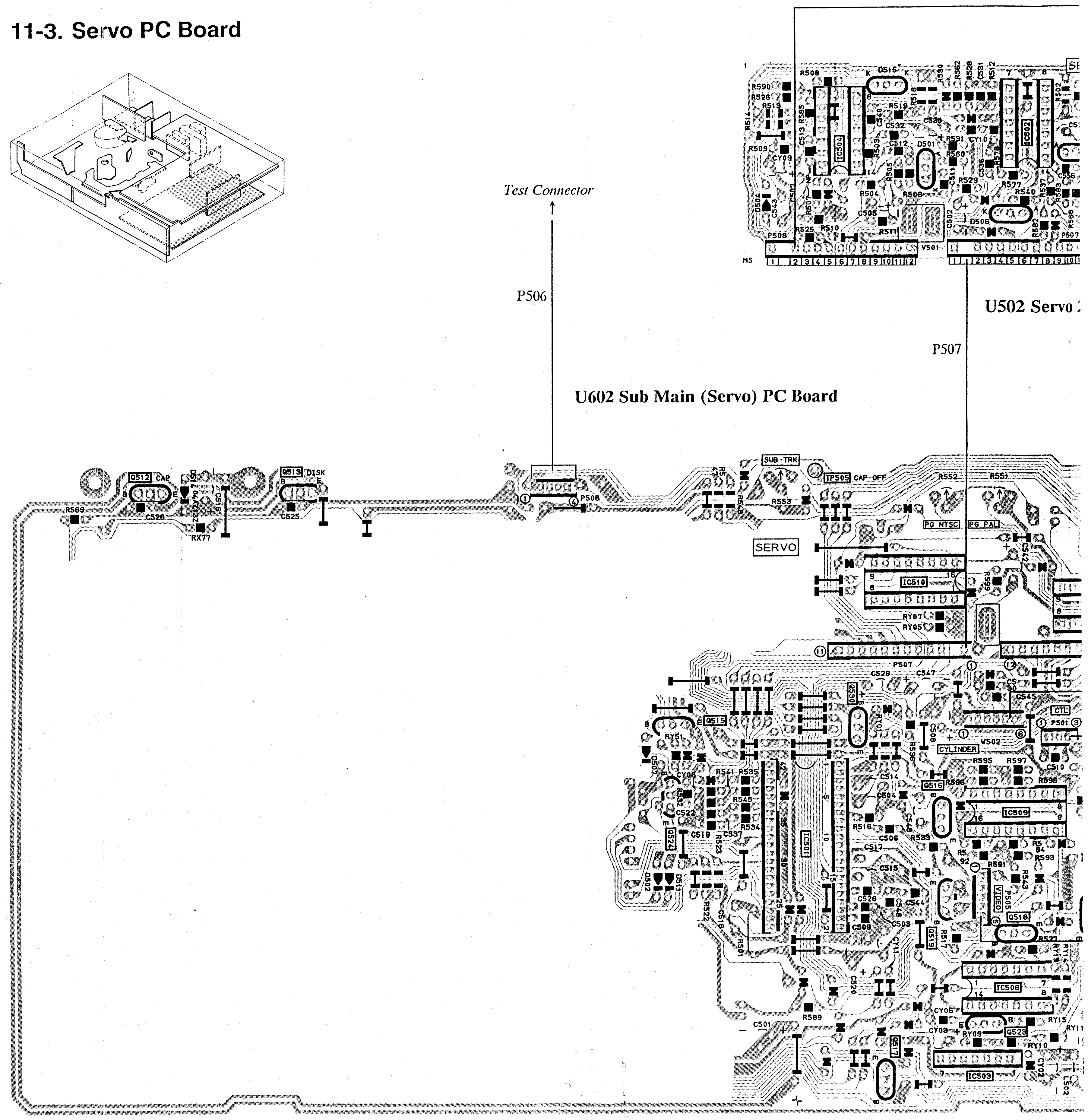
11-2. Servo Circuit


U502 SERVO 2
V:REC
( ) V:PLAY
U602 SERVO
IC502 LM2902N OP AMP
IC507 TA75393S COMPARATOR
IC504 LM2902N OP AMP
IC510 TC4051BP SELECTOR
IC509 TC4051BP SELECTOR
IC501 TD6372-E3 SERVO IC
IC506 TA75393P COMPARATOR
IC508 TC4030BP EXCLUSIVE OR
IC511 TC4053BP SELECTOR
IC514 TC4538BP M.M
IC503 AN5560 DETECT
Q513 2SD1413 REGULATOR
Q512 2SD1413 REGULATOR
Q520 2SC2236Y REGULATOR
Q515 RN1204 SWITCH
Q517 2SC2458Y SWITCH
Q518 2SC2458Y BUFFER
Q519 RN1204 INVERTER
Q523 RN1206 INVERTER
Q530 RN2204 SWITCH
Q516 RN1204 SWITCH
Q524 RN2202 INVERTER
Q541 2SC2668Y BUFFER
Q540 2SC2668Y AMP
Q542 RN1204 SWITCH
P505(WHT)
TO P204 U202 VIDEO
P507
P508
TO LOGIC
CYLINDER APC
CYLINDER AFC
CYLINDER ERROR
CAPSTAN APC
CAPSTAN AFC
CAPSTAN ERROR
CAPSTAN FG
CYLINDER FG
CYLINDER PG
COMP SYNC SIGNAL
CONTROL PLAY SIGNAL
CONTROL REC SIGNAL
CONTROL REC/PLAY
ON/OFF +5V
MAIN B500K TRACKING
SUB TRK
CAP OFF
PG PAL
PG NTSC

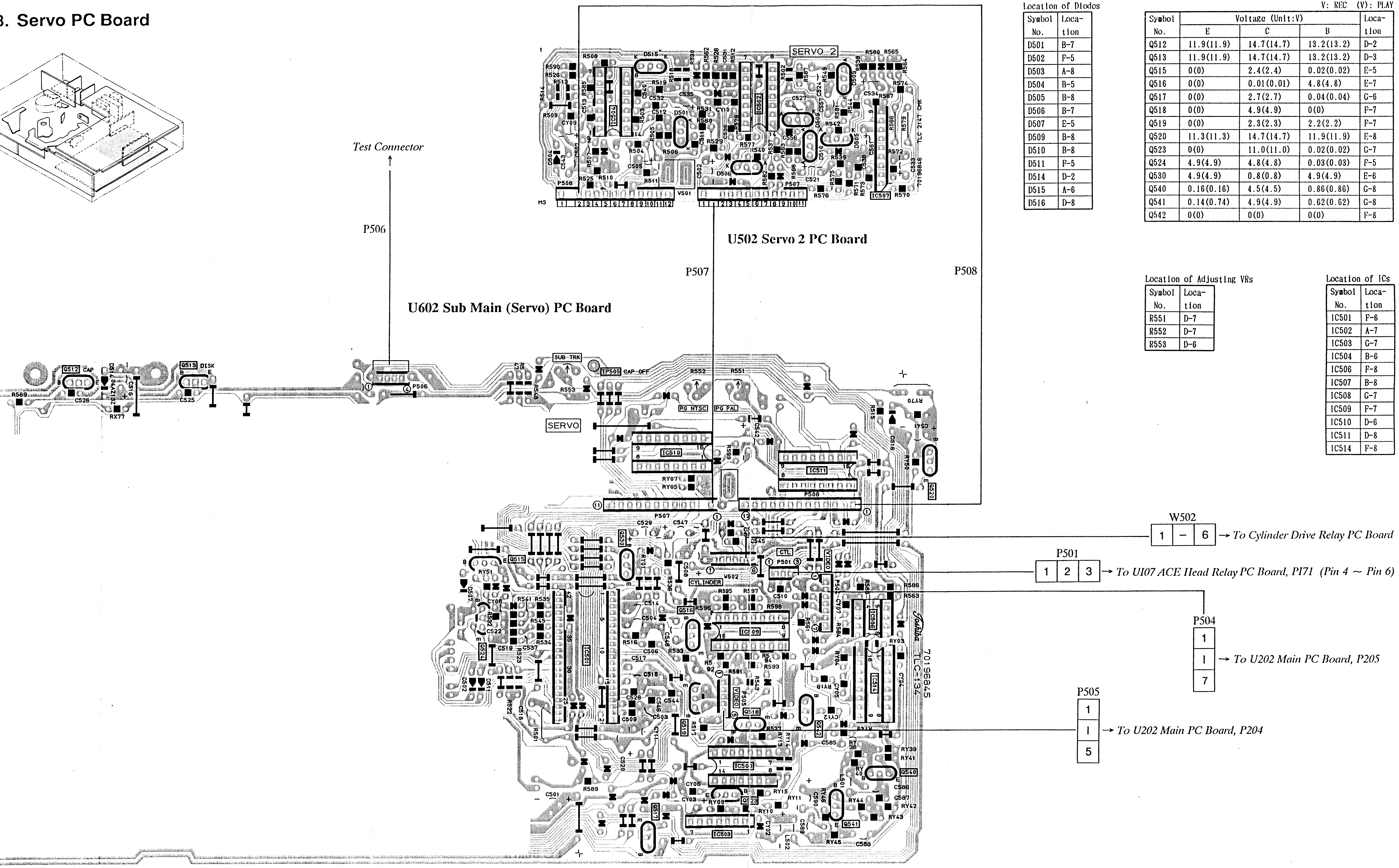

6
7
8
9
10
11
12
13
14
15
16
602 SERVO
V:REC
( ) V:PLAY
CYLINDER ERROR
Q515 RN1204 SWITCH
IC510 TC4051BP SELECTOR
IC509 TC4051BP SELECTOR
Q513 2SD1413 REGULATOR
Q512 2SD1413 REGULATOR
Q520 2SC2236Y REGULATOR
Q519 RN1204 INVERTER
IC506 TA75393P COMPARATOR
COMP SYNC SIGNAL
CAPSTAN ERROR
CAPSTAN FG
CYLINDER FG
CYLINDER PG
U105
MECHA BASE MAIN
P601
P151
CAPSTAN+B
CAPSTAN GND
GND
TAPE END LED
STROBE
ON/OFF+5V
DATA OUT
EVER+5V
SERIAL CLOCK
ON/OFF+9V
TU REEL PULSE
SU REEL PULSE
CAP CTL REF
FG B
CAP CTL
CAPSTAN F/R
FG A
LIMITER
(FFC)
WHT
P152
CAP CTL REF
FG B
CAPSTAN CTL
LIMITER
CAPSTAN F/R
FG A
ON/OFF+5V
CAPSTAN GND
CAPSTAN +B
IC GND
BM31
CAPSTAN MOTOR
FG CAPSTAN
CAPSTAN MOTOR
+32V
LOGIC +5V
MOTOR GND
MOTOR +B
ON/OFF +5V
ON/OFF +9V
TO POWER
Q517 2SC2458Y SWITCH
IC501 TD6372-E3 SERVO IC
GND
REC GATE
C-AFC
C-APC
Vcc
D-APC
D-AFC
N/P
S2
S1
REV/FWD
M3
M2
M1
TEST
INDEX
CTL OUT
SPEED B
SPEED A
INJ
SC IN
REC CTL
S4/W3/S2
TRK.D
FP.D
C-REF
D-REF
C-SYNC
D-FF
A-FF
QV OUT
QH OUT
VP ON
VP D
PG
D-PG
D-FG
FG IN
CTL IN
CAPSTAN AFC
CAPSTAN APC
CYLINDER APC
CYLINDER AFC
CAP OFF
TP505
D502 1SS176
D511 1SS176
D513 1SS176
D512 1SS176
CONTROL REC SIGNAL
IC508 TC4030BP EXCLUSIVE OR
SW.D
T.REF
Q518 2SC2458Y BUFFER
IC511 TC4053BP SELECTOR
PG PAL
PG NTSC
IC514 TC4538BP M.M
IC503 AN5560 DETECT
VOC
V IN
H IN
GND
MAN SW
50/60
HOLD
CYLINDER MOTOR DRIVE UNIT
W502
CYLINDER ERROR
CYLINDER VCO
CYLINDER GND
PG
BIAS
CYLINDER FG
VCO
TA8423P
FG
U107
ACE HEAD RELAY
P501
CTL 2
GND
CTL 1
RED
BLK
WHT
P171
A HEAD(PLAY)
CONTROL HEAD
Q523 RN1206 INVERTER
CONTROL REC/PLAY SIGNAL
(VIDEO)
P504
SYSTEM SW
V-LOCK NTSC
V-LOCK PAL
CC IR +B
BG PULSE
ENVELOPE
TO VIDEO
ORG
AUTO
PAL
NTSC
V-LOCK PAL
CAPSTAN FG
CONTROL PLAY SIGNAL
Q530 RN2204 SWITCH
SUB TRK
Q516 RN1204 SWITCH
Q524 RN2202 INVERTER
D507 1SS176
Q541 2SC2668Y BUFFER
Q540 2SC2668Y AMP
Q542 RN1204 SWITCH
P506(WHT)
CTL
SW PULSE
GND
ENVELOPE
TEST CONNECTOR

Cylinder Servo	Capstan Servo	
① a: IC504, Pin ① (PLAY) G-3  V: 0.5V/div. H: 10ms/div.	⑥ IC501, Pin ⑰ F-8  V: 0.2V/div. H: 10ms/div.	⑫ IC501, Pin ⑪ (STILL) E-8  V: 1V/div. H: 5ms/div.
① b: IC504, Pin ① (CUE) G-3  V: 0.5V/div. H: 2ms/div.	⑦ IC501, Pin ⑱ F-8  V: 0.5V/div. H: 1ms/div.	⑬ IC501, Pin ⑦ (EE) E-8  V: 1V/div. H: 5ms/div.
② IC501, Pin ⑳ (PLAY) F-8  V: 1V/div. H: 10ms/div.	⑧ IC501, Pin ㊱, ㊲ E-7  V: 1V/div. H: 10 μs/div.	⑭ IC501, Pin ③ (PLAY) D-8  V: 1V/div. H: 10ms/div.
③ IC501, Pin ⑲ F-8  V: 1V/div. H: 0.5ms/div.	⑨ IC501, Pin ㉒ (POWER) F-8  V: 0.2V/div. H: 0.1μs/div.	⑮ IC501, Pin ① (REC) D-8  V: 1V/div. H: 10ms/div.
④ IC501, Pin ㊴, ㊵ D-7  V: 1V/div. H: 10 μs/div.	⑩ IC501, Pin ⑭ (STILL) E-8  V: 1V/div. H: 5ms/div.	⑯ IC503, Pin ② (PLAY) F-11  V: 2V/div. H: 5ms/div.
⑤ IC502, Pin ⑭ (SLOW) C-3  V: 1V/div. H: 10ms/div.	⑪ IC501, Pin ⑯ (PLAY) E-8  V: 1V/div. H: 5ms/div.	⑰ IC503, Pin ③ (PLAY) F-11  V: 1V/div. H: 20 μs/div.

11-3. Servo PC Board


A
B
C
D
E
F
G
Test Connector
P506
P507
U502 Servo
U602 Sub Main (Servo) PC Board
SERVO
SUB TRK
CAP-OFF
PG NTSC
PG PAL
CYLINDER
CTL
VIDEO
IC501
IC502
IC503
IC504
IC508
IC509
IC510
Q512 CAP
Q513 DISK
Q515
Q516
Q517
Q518
Q519
Q523
Q530
V501
V502
MS

3. Servo PC Board


Test Connector
P506
P507
P508
U502 Servo 2 PC Board
U602 Sub Main (Servo) PC Board
SERVO 2
SERVO
TLC 2147 CHK
70196846
Toshiba
70196845
TLC-134
W502
1 – 6 → To Cylinder Drive Relay PC Board
P501
1 2 3 → To U107 ACE Head Relay PC Board, P171 (Pin 4 ~ Pin 6)
P504
1 I 7 → To U202 Main PC Board, P205
P505
1 I 5 → To U202 Main PC Board, P204
IC501
IC502
IC503
IC504
IC506
IC507
IC508
IC509
IC510
IC511
IC514
CYLINDER
VIDEO
CTL
PG NTSC
PG PAL
SUB TRK
CAP OFF

Location of Diodes

Symbol No.	Location
D501	B-7
D502	F-5
D503	A-8
D504	B-5
D505	B-8
D506	B-7
D507	E-5
D509	B-8
D510	B-8
D511	F-5
D514	D-2
D515	A-6
D516	D-8

Voltage and Location of Transistors

V: REC (V): PLAY

Symbol No.	Voltage (Unit:V)			Location
	E	C	B	
Q512	11.9(11.9)	14.7(14.7)	13.2(13.2)	D-2
Q513	11.9(11.9)	14.7(14.7)	13.2(13.2)	D-3
Q515	0(0)	2.4(2.4)	0.02(0.02)	E-5
Q516	0(0)	0.01(0.01)	4.8(4.8)	E-7
Q517	0(0)	2.7(2.7)	0.04(0.04)	G-6
Q518	0(0)	4.9(4.9)	0(0)	F-7
Q519	0(0)	2.3(2.3)	2.2(2.2)	F-7
Q520	11.3(11.3)	14.7(14.7)	11.9(11.9)	E-8
Q523	0(0)	11.0(11.0)	0.02(0.02)	G-7
Q524	4.9(4.9)	4.8(4.8)	0.03(0.03)	F-5
Q530	4.9(4.9)	0.8(0.8)	4.9(4.9)	E-6
Q540	0.16(0.16)	4.5(4.5)	0.86(0.86)	G-8
Q541	0.14(0.74)	4.9(4.9)	0.62(0.62)	G-8
Q542	0(0)	0(0)	0(0)	F-8

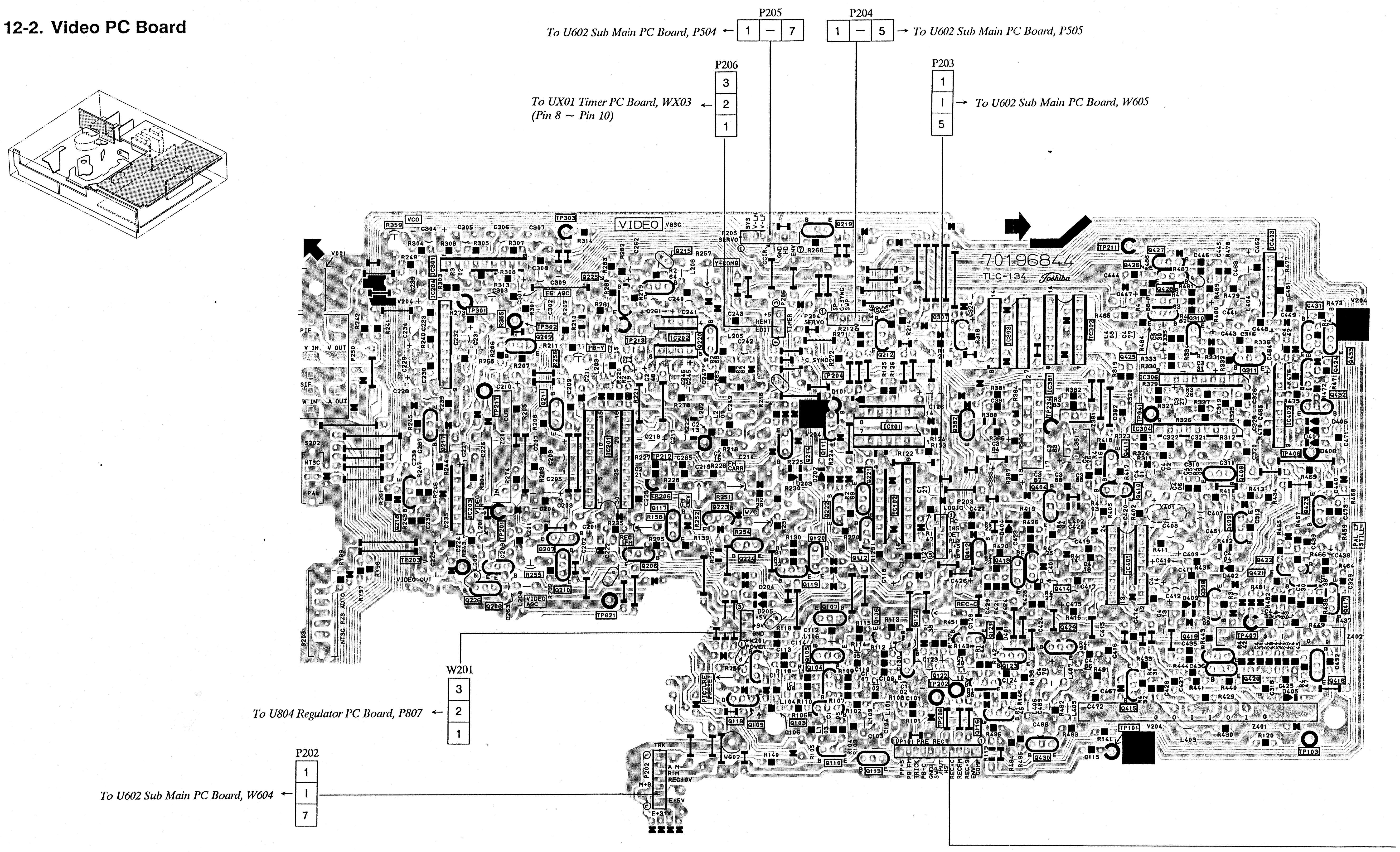
Location of Adjusting VRs

Symbol No.	Location
R551	D-7
R552	D-7
R553	D-6

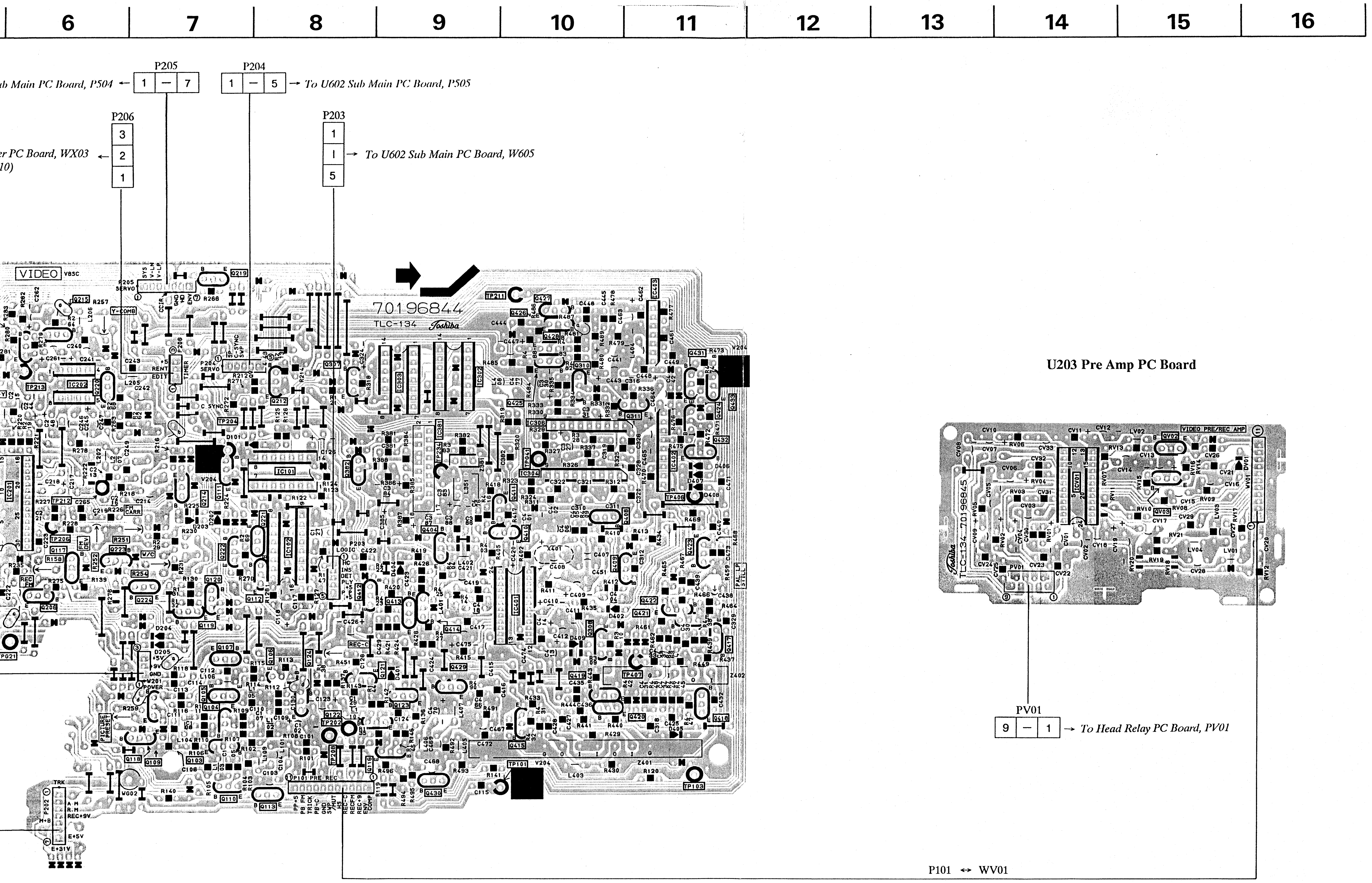
Location of ICs

Symbol No.	Location
IC501	F-6
IC502	A-7
IC503	G-7
IC504	B-6
IC506	F-8
IC507	B-8
IC508	G-7
IC509	F-7
IC510	D-6
IC511	D-8
IC514	F-8

12-2. Video PC Board


P205
1 – 7
To U602 Sub Main PC Board, P504
P204
1 – 5
To U602 Sub Main PC Board, P505
P206
3
2
1
To UX01 Timer PC Board, WX03
(Pin 8 ~ Pin 10)
P203
1
I
5
To U602 Sub Main PC Board, W605
VIDEO
70196844
TLC-134
Toshiba
W201
3
2
1
To U804 Regulator PC Board, P807
P202
1
I
7
To U602 Sub Main PC Board, W604

U202 Main (Video) PC Board


6
7
8
9
10
11
12
13
14
15
16
P205
1 — 7
b Main PC Board, P504
P204
1 — 5
To U602 Sub Main PC Board, P505
P206
3
2
1
er PC Board, WX03
10)
P203
1
I
5
To U602 Sub Main PC Board, W605
VIDEO
70196844
TLC-134
Toshiba
VIDEO PRE/REC AMP
70196845
TLC-134
PV01
9 — 1
To Head Relay PC Board, PV01
P101 ↔ WV01

U203 Pre Amp PC Board

U202 Main (Video) PC Board

Voltage and Location of Transistors V : PAL REC (V) : PAL PLAY
V/V : SP/LP REC <V/V> : SP/LP PLAY

Symbol No.	Voltage (Unit:V)			Location
	E	C	B	
Q103	0(1.6)	0.2(3.4)	0.1(2.3)	F-7
Q104	0.2(4.1)	0(1.4)	0.2(3.4)	F-7
Q105	0(3.6)	0.2(5.0)	0.2(4.1)	F-7
Q106	0.2(1.4)	0(0)	0(0.9)	E-8
Q107	0(0.9)	0.2(5.0)	0.2(1.4)	E-7
Q109	0(0)	0.1(0.1↔0)	0(0↔4.8)	F-7
Q110	0(0)	0.1<0.1/0>	0<0/4.3>	G-7
Q111	0(0)	Lo: 0. Hi: 5.0	Lo: 0. Hi: 4.8	D-7
Q112	0(0)	Lo: 0. Hi: 5.0	Lo: 0(0) Hi: 4.6(4.3)	E-8
Q113	0(0)	Lo: 4.4(0.1) Hi: 6.7(2.2)	0↔2.5(0)	G-8
Q116	6.1(0.2)	0(0)	5.5(0)	F-8
Q117	2.1(0.2)	0(0)	1.5(1.8)	E-6
Q118	0(0)	0↔2.5(0)	0.2(5.0)	F-7
Q119	0(0)	2.0/0<0.2/0>	0/4.3<0/4.3>	E-7
Q120	2.8/2.2(0.2)	0(0)	2.2/1.6(0.2)	E-7
Q121	2.6(0)	6.2(0)	5.5(0.1)	F-9
Q122	6.2(0)	8.9(0.2)	5.5(0)	F-8
Q123	0(0)	5.5/0<0/0>	0/4.3<0/4.3>	F-9
Q124	0(0)	0(0.1↔0)	0(0↔4.8)	E-8
Q206	0(0)	0(0)	0.1(2.2)	E-6
Q207	3.3<3.2↔0.6>	3.3↔0 <0↔3.2>	2.9<0↔2.6>	E-5
Q208	0(0)	0.2(0.1↔0>	0<0↔4.8>	E-5
Q209	2.0(2.1)	0(0)	2.6(2.7)	C-5
Q210	0(0)	3.3↔0 <3.2↔0>	0↔4.9 <0↔4.9>	E-5
Q211	3.3↔0.7(2.7)	3.3↔0 <3.3↔0>	2.7↔0.1(5.0)	D-5
Q212	5.0(5.0)	Lo: 0, Hi: 5.0	Lo: 4.4, Hi: 5.0	C-8
Q214	0(0)	0.1↔0 <0.1↔0>	0↔4.9 <0↔4.9>	D-7
Q215	2.4(2.4)	0(0)	1.7(1.7)	C-6
Q217	4.6(4.6)	8.9(8.9)	5.3(5.3)	D-4
Q218	2.9(2.9)	0(0)	2.3(2.3)	E-4
Q219	5.0(5.0)	0(0↔4.9>	4.9<0.4↔4.9>	B-7
Q220	3.0(3.0)	5.0(5.0)	3.7(3.7)	C-6
Q221	0(0)	0.1/5.0<0.1/5.0>	2.7/0<2.7/0>	D-8
Q222	0(0)	2.8/0<2.8/0>	2.2/4.3<2.2/4.3>	E-7
Q223	0(0)	3.2<0↔3.2>	0<0↔4.2>	E-6
Q224	0(0)	0<0↔4.2>	4.4<0.1↔4.4>	E-7
Q225	4.0(4.0)	1.4(1.4)	3.3(3.3)	C-5
Q226	4.9(4.9)	0↔4.9 (0↔4.9)	4.9↔0.4 (4.9↔0.4)	E-4
Q307	5.0(5.0)	Lo: 0. Hi: 5.0	Lo: 0.1. Hi: 5.0	C-8
Q308	1.7(1.8)	5.0(5.0)	2.4(2.5)	E-10
Q310	1.1(1.1)	3.9(3.9)	1.7(1.7)	C-10
Q311	3.3(3.3)	5.0(5.0)	3.9(3.9)	D-11
Q382	0(0)	0(0↔2.0)	0(0↔4.8)	D-8
Q404	4.5(4.5)	5.0(5.0)	5.0(5.0)	D-9
Q408	0(0)	3.0↔0 (3.0↔0)	0↔4.3 (0.6↔4.3)	D-11
Q409	2.7(3.0)	5.0(5.0)	3.2(3.6)	E-10
Q410	0(0)	Lo: 0.2. Hi: 5.0	Lo: 0.1. Hi: 1.8	D-10
Q411	Lo: 0.1. Hi: 4.4	5.0(5.0)	Lo: 0.2. Hi: 5.0	D-10
Q412	5.0(5.0)	5.0(0)	0.2(5.0)	E-8
Q413	1.3(0)	3.7(3.2)	1.9(0)	E-9
Q414	0(0.9)	3.7(3.2)	0.1(1.5)	E-9
Q415	1.4(1.4)	5.0(5.0)	2.1(2.1)	F-10
Q417	1.4(1.4↔3.1)	5.0(5.0)	0(0↔3.7)	E-11
Q418	4.3(1.5↔4.3)	5.0(5.0)	2.1(2.1)	F-11
Q419	3.2(1.7↔3.2)	5.0(5.0)	3.8(3.8)	F-10
Q420	3.2(1.7↔3.2)	5.0(5.0)	2.3(2.3)	F-11
Q421	1.0(1.0)	2.9(2.9)	1.7(1.7)	E-11
Q422	3.5(3.5)	1.5(1.5)	2.9(2.9)	E-11
Q423	2.8(2.8)	5.0(5.0)	3.5(3.5)	E-11
Q424	1.6(1.6)	5.0(5.0)	2.3(2.3)	C-11
Q425	2.7(2.7)	7.5(7.5)	3.5(3.5)	C-10
Q426	2.4(2.4)	8.9(8.9)	3.1(3.1)	C-10
Q427	0(0)	0(0)	0.4↔4.9 (0.4↔4.9)	C-10
Q428	6.9(6.9)	8.9(8.9)	7.5(7.5)	C-10
Q429	0.2(5.0)	0(5.0)	0(0.6↔4.3)	F-9
Q430	0(0.5)	0.2(5.0)	0.1(1.2)	G-9
Q431	Lo: 0. Hi: 4.3	5.0(5.0)	Lo: 0.1. Hi: 4.9	C-11
Q432	0(0)	Lo: 0. Hi: 4.5	Lo: 0. Hi: 4.3	D-11
Q433	0(0)	4.3/0<4.2/0>	0/0.7<0/0.7>	C-11
QV02	0(1.8)	0.3(5.0)	0(2.5)	D-15
QV03	0(2.3)	0.3(5.0)	0(2.9)	D-15

Location of ICs

Symbol No.	Location
IC101	D-8
IC102	E-8
IC201	D-6
IC202	C-6
IC203	E-4
IC204	C-4
IC301	C-4
IC302	C-9
IC303	C-9
IC304	D-10
IC306	D-10
IC381	D-9
IC401	E-10
IC402	D-11
IC403	C-11
ICV01	D-14

Location of Diodes

Symbol No.	Location
D101	D-7
D202	D-7
D203	D-7
D204	E-7
D205	E-7
D401	F-9
D402	E-10
D404	E-9
D405	F-11
D406	D-11
D407	D-11
D408	D-11
D409	E-10
DV01	D-16

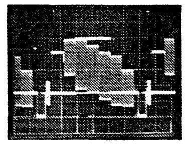
Location of Adjusting VRs

Symbol No.	Location
R158	E-6
R251	D-6
R252	E-6
R254	E-7
R255	E-5
R256	C-5
R257	C-6
R259	F-7
R355	C-5
R359	B-4
R451	E-8
R459	E-11

12-3. Video Circuit

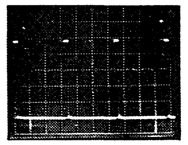
REC Mode

① TP201 E-14
(VIDEO IN)



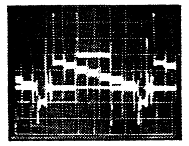
V: 0.2V/div.
H: 10 μs/div.

② TP204 F-4
(C.SYNC)



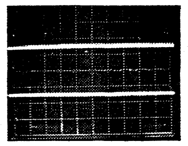
V: 1V/div.
H: 20 μs/div.

③ TP206 C-5



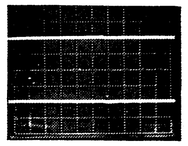
V: 0.1V/div.
H: 10 μs/div.

④ TP202 A-14
(REC FM LP)



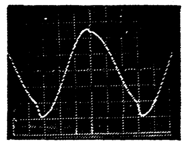
V: 0.1V/div.
H: 10 μs/div.

⑤ TP202 A-14
(REC FM SP)



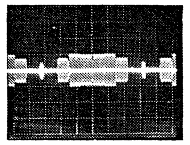
V: 0.1V/div.
H: 10 μs/div.

⑥ TP234 D-13
(SECAM DET)



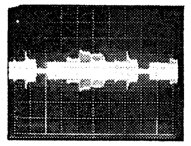
V: 1V/div.
H: 20 μs/div.

⑦ TP208 A-13
(REC PAL SP)



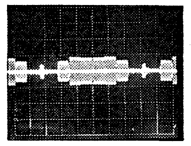
V: 0.1V/div.
H: 10 μs/div.

⑧ TP208 A-13
(MESECAM SP)



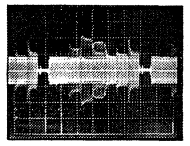
V: 0.1V/div.
H: 10 μs/div.

⑨ TP208 A-13
(REC PAL LP)



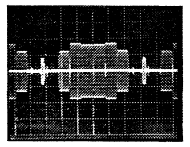
V: 0.1V/div.
H: 10 μs/div.

⑩ IC401, Pin ⑫ E-11
(MESECAM)



V: 0.2V/div.
H: 10 μs/div.

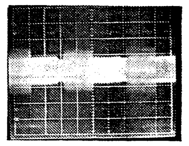
⑪ IC401, Pin ⑫ E-11
(PAL)



V: 0.2V/div.
H: 10 μs/div.

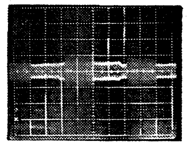
PLAY Mode

⑫ TP101 D-2
(PAL SP)



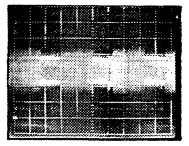
V: 0.1V/div.
H: 5ms/div.

⑬ TP101 D-2
(PAL LP)



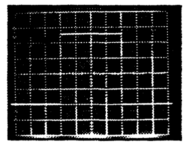
V: 0.1V/div.
H: 5ms/div.

⑭ TP101 D-2
(NTSC SP)



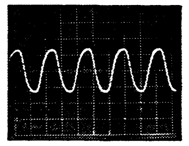
V: 0.1V/div.
H: 5ms/div.

⑮ TP103 B-7



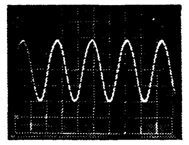
V: 1V/div.
H: 5ms/div.

⑯ TP211 E-9
(4.43MHz CW)



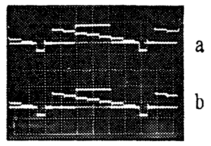
V: 0.2V/div.
H: 0.1μs/div.

⑰ IC202, Pin ⑦ B-6



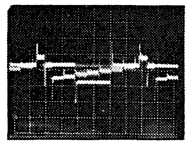
V: 0.2V/div.
H: 50ns/div.

⑱ a: TP213 C-4
b: TP212 C-6



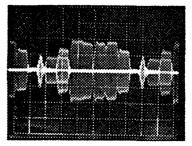
V: 0.2V/div.
H: 10 μs/div.

⑲ IC201, Pin ⑰ C-6



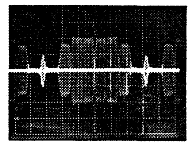
V: 0.2V/div.
H: 10 μs/div.

⑳ IC401, Pin ⑫ E-11
(4.43MHz NTSC)



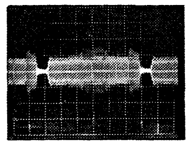
V: 0.2V/div.
H: 10 μs/div.

㉑ IC401, Pin ⑫ E-11
(PAL)



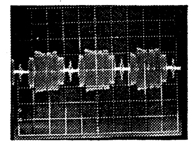
V: 0.2V/div.
H: 10 μs/div.

㉒ IC401, Pin ⑫ E-11
(MESECAM)



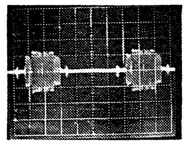
V: 0.2V/div.
H: 10 μs/div.

㉓ IC201, Pin ⑫ F-6
(4.43MHz NTSC)



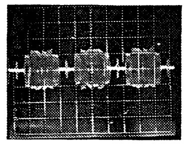
V: 0.2V/div.
H: 20 μs/div.

㉔ IC201, Pin ⑫ F-6
(NTSC/PAL)



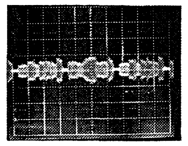
V: 0.2V/div.
H: 20 μs/div.

㉕ IC201, Pin ⑫ F-6
(PAL)



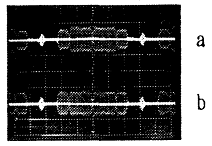
V: 0.2V/div.
H: 20 μs/div.

㉖ IC201, Pin ⑫ F-6
(MESECAM)



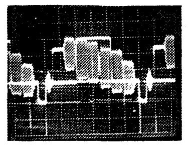
V: 0.2V/div.
H: 20 μs/div.

㉗ a: TP407 E-19
b: TP406 G-17
(PAL LP)



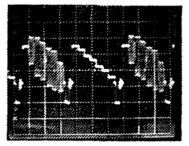
V: 0.5V/div.
H: 10 μs/div.

㉘ TP203 E-3

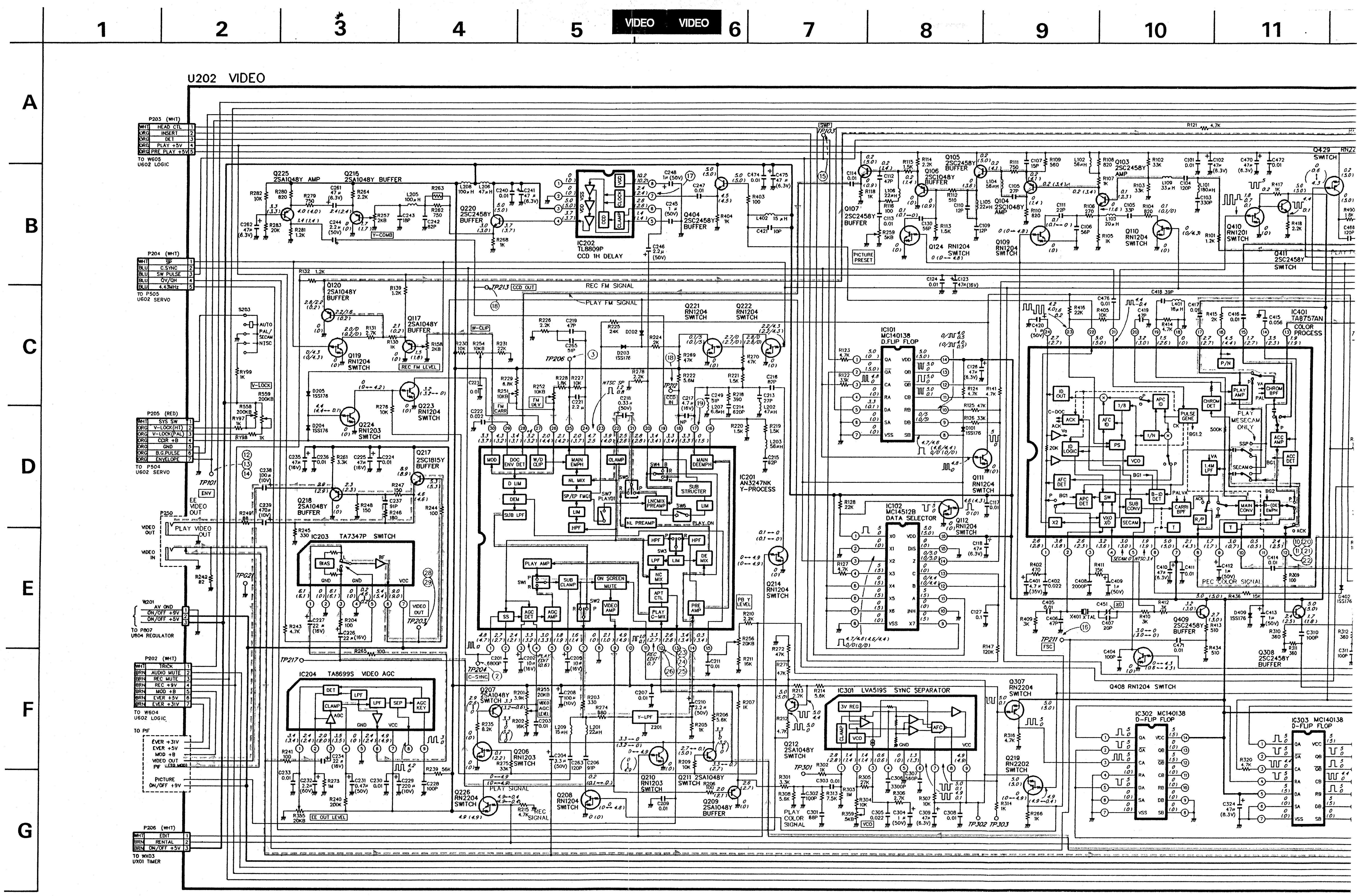


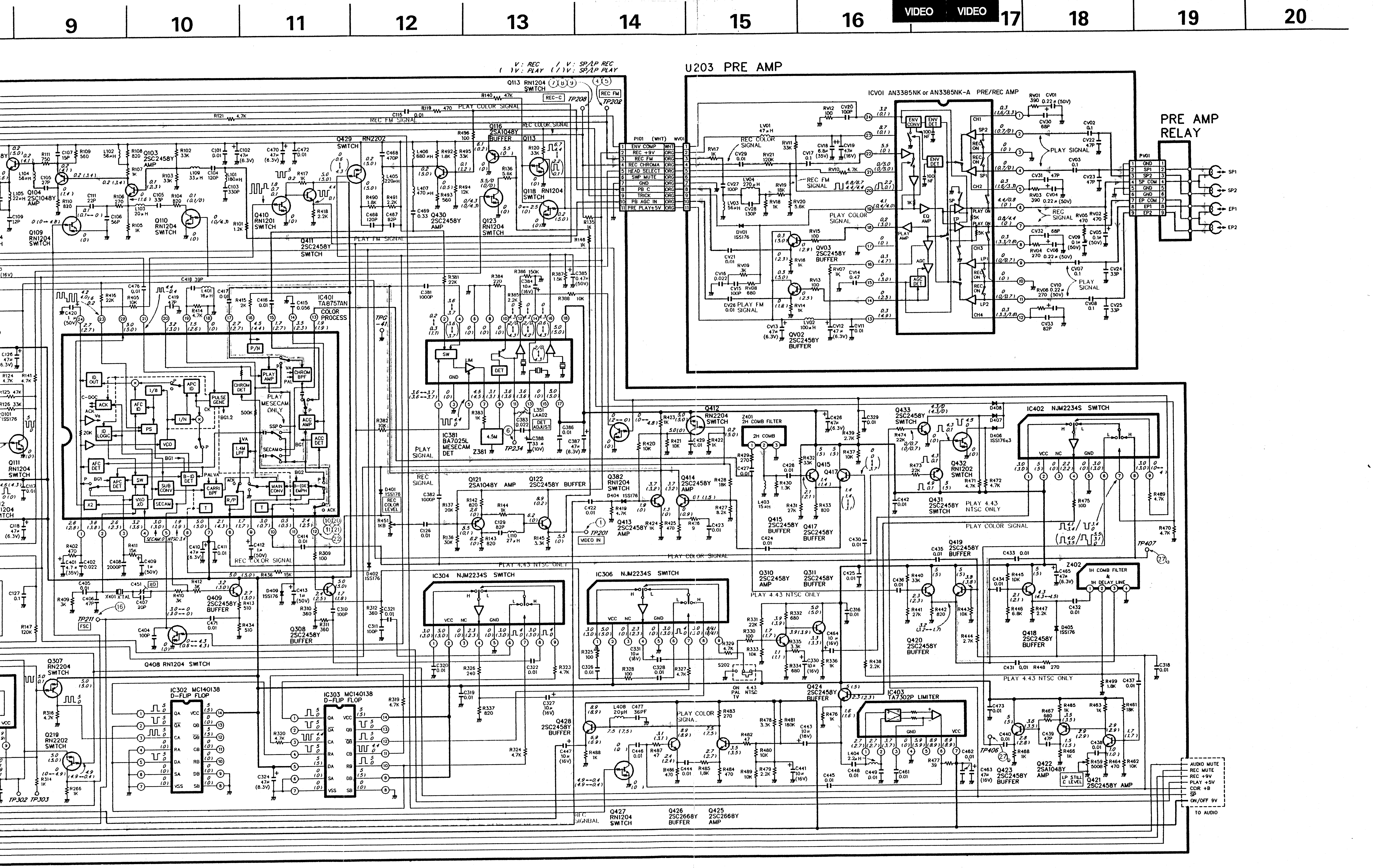
V: 0.5V/div.
H: 10 μs/div.

㉙ TP203 E-3
(NTSC/PAL)

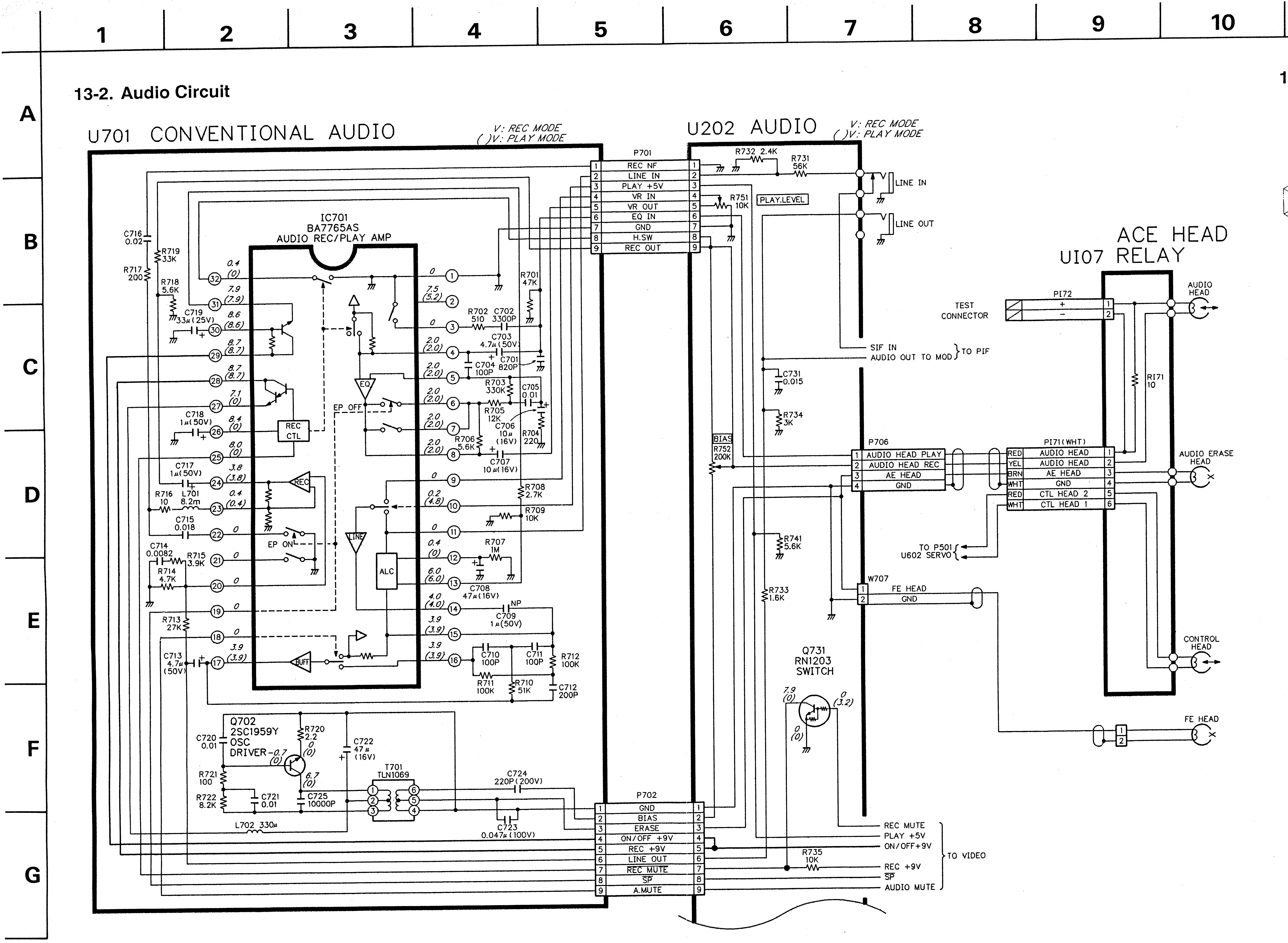


V: 0.5V/div.
H: 20 μs/div.

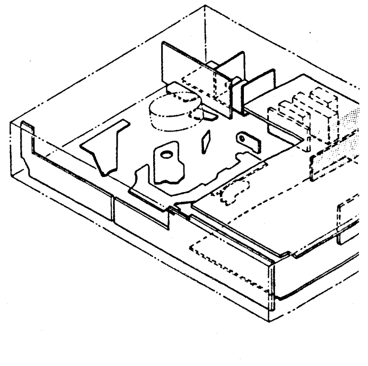

U202 VIDEO
1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
P203 (WHT)
HEAD CTL
INSERT
DET
PLAY +5V
PRE PLAY +5V
TO W605 U602 LOGIC
P204 (WHT)
SP
C.SYNC
SW PULSE
QV/QH
4.43MHz
TO P505 U602 SERVO
P205 (RED)
SYS SW
V-LOCK(HT)
V-LOCK(PAL)
CCIR +B
GND
B.G.PULSE
ENVELOPE
TO P504 U602 SERVO
W201
AV GND
ON/OFF +9V
ON/OFF +5V
TO P807 U804 REGULATOR
P202 (WHT)
TRICK
AUDIO MUTE
REC MUTE
REC +9V
MOD +B
EVER +5V
EVER +31V
TO W604 U602 LOGIC
TO PIF
EVER +31V
EVER +5V
MOD +B
VIDEO OUT
PIF
PICTURE ON/OFF +9V
P206 (WHT)
EDIT
RENTAL
ON/OFF +5V
TO WX03 UX01 TIMER
P250
PLAY VIDEO OUT
VIDEO OUT
VIDEO IN
EE VIDEO OUT
Q225 2SA1048Y AMP
Q215 2SA1048Y BUFFER
Y-COMB
Q220 2SC2458Y BUFFER
IC202 TLB809P CCD 1H DELAY
Q404 2SC2458Y BUFFER
Q120 2SA1048Y BUFFER
Q117 2SA1048Y BUFFER
Q119 RN1204 SWITCH
REC FM LEVEL
Q223 RN1204 SWITCH
Q224 RN1203 SWITCH
V-LOCK
Q217 2SC1815Y BUFFER
Q218 2SA1048Y BUFFER
IC203 TA7347P SWITCH
BIAS
IC204 TA8699S VIDEO AGC
DET
LPF
CLAMP
SEP
AGC KEY
EE OUT LEVEL
TP217
CCD OUT
REC FM SIGNAL
PLAY FM SIGNAL
W-CLIP
Q221 RN1204 SWITCH
Q222 RN1204 SWITCH
IC201 AN3247NK Y-PROCESS
MOD
DOC ENV DET
W/D CLIP
MAIN EMPH
CLAMP
MAIN DEEMPH
D LIM
DEM
SUB LPF
NL MIX
SP/EP FMC
LIM
HPF
LNCMIX PREAMP
NL PREAMP
SUB STRUCTER
PLAY AMP
SUB CLAMP
ON SCREEN MUTE
VIDEO AMP
SS
AGC DET
AGC AMP
NC MIX
APT CTL
PLAY C-MIX
PRE AMP
DE MIX
Q214 RN1204 SWITCH
PB Y LEVEL
C-SYNC
Q207 2SA1048Y SWITCH
Q206 RN1203 SWITCH
PLAY SIGNAL
Q226 RN2204 SWITCH
REC SIGNAL
Q208 RN1204 SWITCH
Q210 RN1203 SWITCH
Q211 2SA1048Y SWITCH
Q209 2SA1048Y BUFFER
Y-LPF
Z201
Q212 2SA1048Y SWITCH
IC301 LVA519S SYNC SEPARATOR
3V REG
VCO
AFC
PLAY COLOR SIGNAL
TP301
TP302
TP303
Q307 RN2204 SWITCH
Q219 RN2202 SWITCH
Q107 2SC2458Y BUFFER
Q106 2SC1048Y BUFFER
Q105 2SC2458Y BUFFER
Q104 2SC1048Y AMP
Q103 2SC2458Y AMP
Q124 RN1204 SWITCH
Q109 RN1204 SWITCH
Q110 RN1204 SWITCH
PICTURE PRESET
Q410 RN1201 SWITCH
Q411 2SC2458Y SWITCH
Q429 SWITCH
IC101 MC14013B D.FLIP FLOP
Q111 RN1204 SWITCH
IC102 MC14512B DATA SELECTOR
Q112 RN1204 SWITCH
IC401 TA8757AN COLOR PROCESS
P/N
PLAY AMP
CHROM BPF
CHROM DET
PLAY MESECAM ONLY
ACC AMP
ACC DET
ID OUT
ACK
AFC ID
APC ID
PULSE GENE
ID LOGIC
PS
VCO
1/N
1.4M LPF
AFC DET
APC DET
SW
SUB CONV
B-ID DET
CARRI BPF
MAIN CONV
B-(DE) EMPH
X2
VXO XO
SECAM
R/P
PEC COLOR SIGNAL
X401 XTAL
TP211
FSC
Q409 2SC2458Y BUFFER
Q408 RN1204 SWITCH
Q308 2SC2458Y BUFFER
IC302 MC140138 D-FLIP FLOP
IC303 MC140138 D-FLIP FLOP


VIDEO
VIDEO
9
10
11
12
13
14
15
16
17
18
19
20
V: REC / V: SP/LP REC
( )V: PLAY ( )V: SP/LP PLAY
U203 PRE AMP
ICV01 AN3385NK or AN3385NK-A PRE/REC AMP
PRE AMP RELAY
P101 (WHT) WV01
ENV COMP
REC +9V
REC FM
REC CHROMA
HEAD SELECT
SWP MUTE
GND
PB C
TRICK
PB AGC IN
PRE PLAY+5V
PV01
GND
SP1
SP2
SP COM
GND
GND
EP COM
EP1
EP2
SP1
SP2
EP1
EP2
QV03 2SC2458Y BUFFER
QV02 2SC2458Y BUFFER
DV01 1SS176
REC COLOR SIGNAL
REC FM SIGNAL
PLAY COLOR SIGNAL
PLAY FM SIGNAL
PLAY SIGNAL
REC SIGNAL
PLAY SIGNAL
Q113 RN1204 SWITCH
Q116 2SA1048Y BUFFER
Q118 RN1204 SWITCH
Q123 RN1204 SWITCH
Q429 RN2202 SWITCH
Q430 2SC2458Y AMP
Q410 RN1201 SWITCH
Q411 2SC2458Y SWITCH
Q103 2SC2458Y AMP
Q104 2SC1048Y AMP
Q109 RN1204 SWITCH
Q110 RN1204 SWITCH
Q111 RN1204 SWITCH
IC401 TA8757AN COLOR PROCESS
IC381 BA7025L MESECAM DET
Z381
TP234
TPG-41
REC COLOR SIGNAL
PLAY 4.43 NTSC ONLY
Q409 2SC2458Y BUFFER
Q308 2SC2458Y BUFFER
Q408 RN1204 SWITCH
X401 XTAL
TP211
FSC
Q307 RN2204 SWITCH
Q219 RN2202 SWITCH
TP302 TP303
IC302 MC140138 D-FLIP FLOP
IC303 MC140138 D-FLIP FLOP
IC304 NJM2234S SWITCH
IC306 NJM2234S SWITCH
IC402 NJM2234S SWITCH
Q121 2SA1048Y AMP
Q122 2SC2458Y BUFFER
D401 1SS176
REC COLOR LEVEL
D402 1SS176
Q382 RN1204 SWITCH
D404 1SS176
Q413 2SC2458Y AMP
Q414 2SC2458Y AMP
TP201
VIDEO IN
Q412 RN2204 SWITCH
Z401 2H COMB FILTER
Q415 2SC2458Y BUFFER
Q417 2SC2458Y BUFFER
Q433 2SC2458Y SWITCH
Q432 RN1202 SWITCH
Q431 2SC2458Y SWITCH
PLAY 4.43 NTSC ONLY
D408
D407
D406 1SS176x3
Q310 2SC2458Y AMP
Q311 2SC2458Y BUFFER
PLAY 4.43 NTSC ONLY
Q419 2SC2458Y BUFFER
Q420 2SC2458Y BUFFER
Q418 2SC2458Y BUFFER
Z402 1H COMB FILTER & 1H DELAY LINE
D405 1SS176
TP407
S202
ON PAL TV
4.43 NTSC
Q424 2SC2458Y BUFFER
IC403 TA7302P LIMITER
Q428 2SC2458Y BUFFER
Q427 RN1204 SWITCH
Q426 2SC2668Y BUFFER
Q425 2SC2668Y AMP
REC SIGNAL
Q423 2SC2458Y BUFFER
Q422 2SA1048Y AMP
Q421 2SC2458Y AMP
TP406
LP STILL LEVEL
AUDIO MUTE
REC MUTE
REC +9V
PLAY +5V
CCIR +B
SP
ON/OFF 9V
TO AUDIO
TP208
TP202
REC-C
REC FM

13-2. Audio Circuit


1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
U701 CONVENTIONAL AUDIO
V: REC MODE
( )V: PLAY MODE
IC701
BA7765AS
AUDIO REC/PLAY AMP
P701
REC NF
LINE IN
PLAY +5V
VR IN
VR OUT
EQ IN
GND
H.SW
REC OUT
C716 0.02
R719 33K
R717 200
R718 5.6K
C719 33μ(25V)
C718 1μ(50V)
C717 1μ(50V)
R716 10
L701 8.2m
C715 0.018
C714 0.0082
R715 3.9K
R714 4.7K
R713 27K
C713 4.7μ(50V)
REC CTL
EQ
EP OFF
EP ON
REC
LINE
ALC
BUFF
R701 47K
R702 510
C702 3300P
C703 4.7μ(50V)
C704 100P
C701 820P
R703 330K
C705 0.01
R705 12K
C706 10μ (16V)
R704 220
R706 5.6K
C707 10μ(16V)
R708 2.7K
R709 10K
R707 1M
C708 47μ(16V)
NP
C709 1μ(50V)
C710 100P
C711 100P
R712 100K
R711 100K
R710 51K
C712 200P
Q702
2SC1959Y
OSC DRIVER
R720 2.2
C722 47μ (16V)
C720 0.01
R721 100
R722 8.2K
C721 0.01
C725 10000P
T701 TLN1069
C724 220P(200V)
C723 0.047μ(100V)
L702 330μ
P702
GND
BIAS
ERASE
ON/OFF +9V
REC +9V
LINE OUT
REC MUTE
SP
A.MUTE
U202 AUDIO
R732 2.4K
R731 56K
R751 10K
PLAY.LEVEL
LINE IN
LINE OUT
SIF IN
AUDIO OUT TO MOD
TO PIF
C731 0.015
R734 3K
BIAS
R752 200K
R741 5.6K
R733 1.6K
W707
FE HEAD
GND
Q731
RN1203
SWITCH
R735 10K
REC MUTE
PLAY +5V
ON/OFF+9V
REC +9V
SP
AUDIO MUTE
TO VIDEO
TO P501
U602 SERVO
TEST CONNECTOR
P172
+
−
ACE HEAD
UI07 RELAY
R171 10
P706
AUDIO HEAD PLAY
AUDIO HEAD REC
AE HEAD
GND
P171(WHT)
RED
YEL
BRN
WHT
RED
WHT
AUDIO HEAD
AUDIO HEAD
AE HEAD
GND
CTL HEAD 2
CTL HEAD 1
AUDIO HEAD
AUDIO ERASE HEAD
CONTROL HEAD
FE HEAD

13-3. Audio PC Boa



Voltage and Location of Transistors

V : REC (

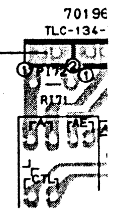
Symbol No.	Voltage (Unit:V)		
	E	C	B
Q702	0(0)	6.7(0)	-0.7(0
Q731	0(0)	7.9(0)	0(3.2)

Location of IC

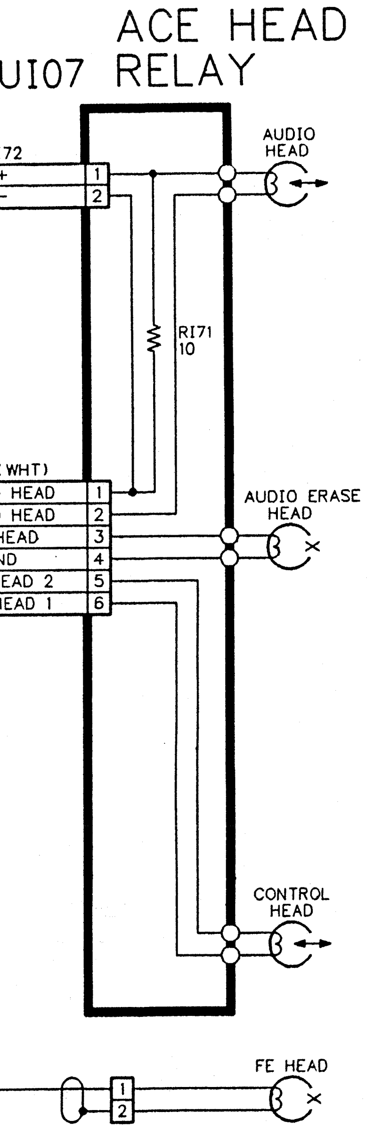
Symbol No.	Location
IC701	B-13

Location of Adjusting VRs

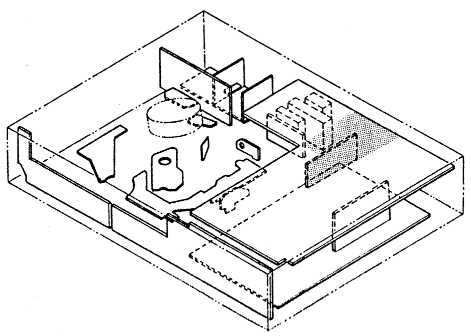
Symbol No.	Location
R751	E-13
R752	D-14


Test Connector
70196
TLC-134-

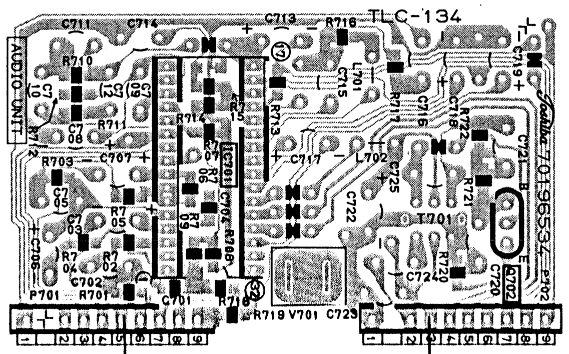
UI07 ACE H
PC Bo


ACE HEAD
UI07 RELAY
72
+
-
AUDIO HEAD
RI71
10
WHT)
HEAD
HEAD
HEAD
ND
EAD 2
EAD 1
1
2
3
4
5
6
AUDIO ERASE HEAD
CONTROL HEAD
FE HEAD

13-3. Audio PC Board



U701 Conventional Audio PC Board


TLC-134
AUDIO UNIT
C711
C714
C713
R716
R710
R711
R703
C707
C705
R705
C706
R704
R702
C702
P701
R701
C701
R719
V701
C723
IC701
R714
R708
R713
C717
L702
T701
C721
C722
C725
C724
R720
R721
R722
Q702
P702

Voltage and Location of Transistors

V : REC (V) : PLAY

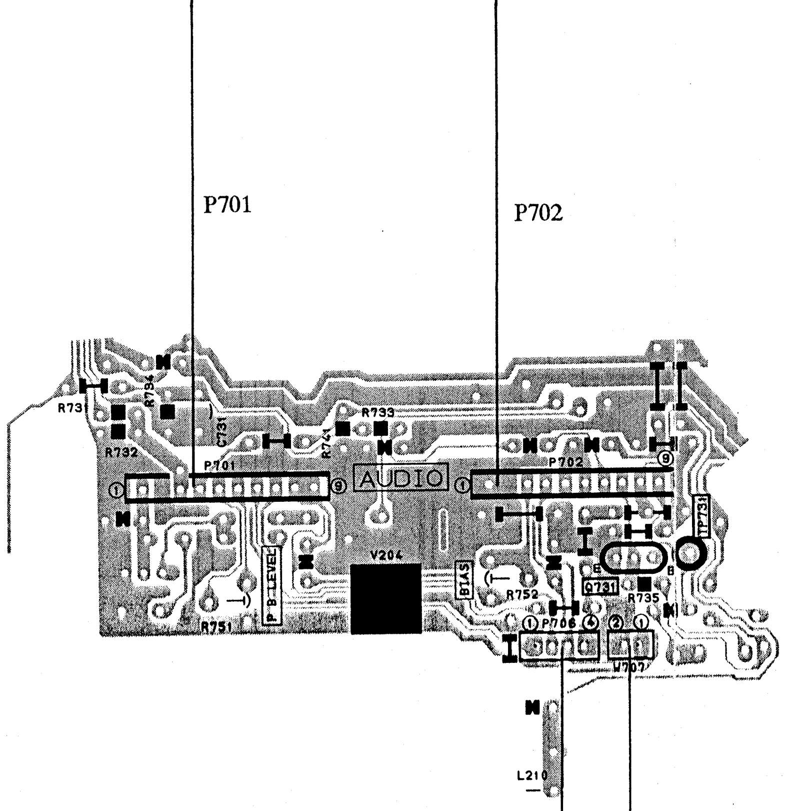
Symbol No.	Voltage (Unit:V) E	C	B	Location
Q702	0(0)	6.7(0)	-0.7(0)	B-14
Q731	0(0)	7.9(0)	0(3.2)	E-14

Location of IC

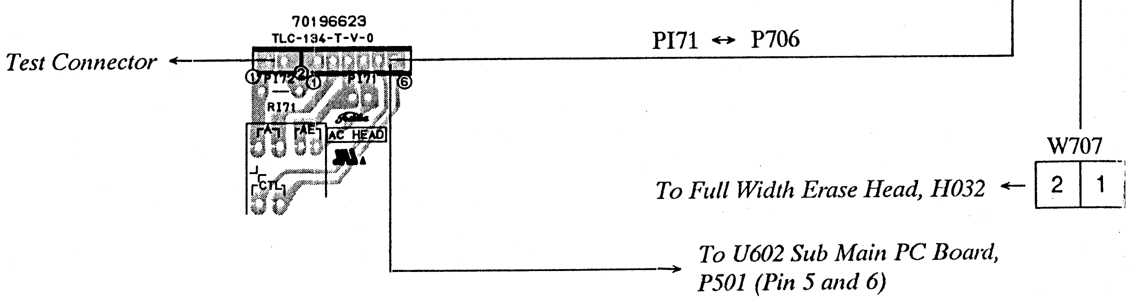
Symbol No.	Location
IC701	B-13

Location of Adjusting VRs

Symbol No.	Location
R751	E-13
R752	D-14


P701
P702
R73
R794
R732
C731
R733
R741
AUDIO
P701
P702
R731
V204
R751
R752
Q731
R735
P706
W707
L210
B
E

U202 Main (Audio) PC Board


70196623
TLC-134-T-V-0
P172
P171
R171
AC HEAD
PI71 ↔ P706
W707
2
1

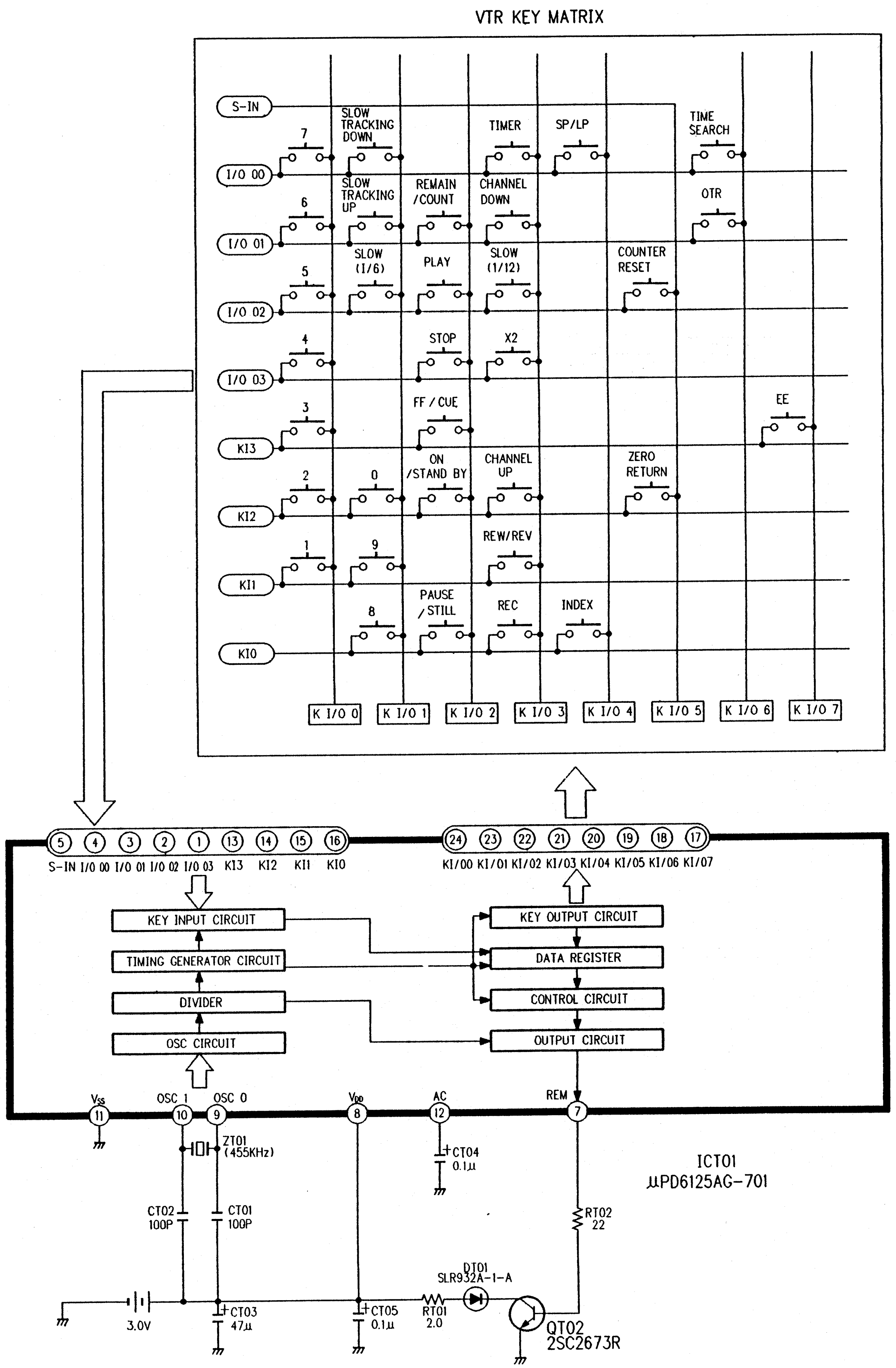
Test Connector ←

To Full Width Erase Head, H032 ←

→ To U602 Sub Main PC Board, P501 (Pin 5 and 6)

UI07 ACE Head Relay PC Board

14. Remote Control Circuit


VTR KEY MATRIX
S-IN
I/O 00
I/O 01
I/O 02
I/O 03
KI3
KI2
KI1
KI0
7
SLOW TRACKING DOWN
TIMER
SP/LP
TIME SEARCH
6
SLOW TRACKING UP
REMAIN /COUNT
CHANNEL DOWN
OTR
5
SLOW (1/6)
PLAY
SLOW (1/12)
COUNTER RESET
4
STOP
X2
3
FF / CUE
EE
2
0
ON /STAND BY
CHANNEL UP
ZERO RETURN
1
9
REW/REV
8
PAUSE /STILL
REC
INDEX
K I/O 0
K I/O 1
K I/O 2
K I/O 3
K I/O 4
K I/O 5
K I/O 6
K I/O 7
5 4 3 2 1 13 14 15 16
S-IN I/O 00 I/O 01 I/O 02 I/O 03 KI3 KI2 KI1 KI0
24 23 22 21 20 19 18 17
KI/00 KI/01 KI/02 KI/03 KI/04 KI/05 KI/06 KI/07
KEY INPUT CIRCUIT
TIMING GENERATOR CIRCUIT
DIVIDER
OSC CIRCUIT
KEY OUTPUT CIRCUIT
DATA REGISTER
CONTROL CIRCUIT
OUTPUT CIRCUIT
Vss 11
OSC 1 10
OSC 0 9
VDD 8
AC 12
REM 7
ZT01 (455KHz)
CT04 0.1µ
CT02 100P
CT01 100P
RT02 22
DT01 SLR932A-1-A
3.0V
CT03 47µ
CT05 0.1µ
RT01 2.0
QT02 2SC2673R
ICT01
µPD6125AG-701

SECTION 4
PARTS LIST

SAFETY PRECAUTION

The parts identified by ⚠ mark are critical for safety. Replace only with part number specified.
The mounting position of replacement is to be identical with originals. The substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.

NOTICE

The part number must be used when ordering parts in order to assist in processing, be sure to include the model number and description.
Parts marked # are of chip type and mounted on original PC boards.
However, when they are placed for servicing works, use discrete parts listed on the parts list.

ABBREVIATIONS

1. **Integrated circuit (IC)**
2. **Capacitor (Cap)**

- **Unit**

Unit		Ex.
F	farad	
MF	microfarad ($\mu F = 10^{-6}F$)	10MF = $10\mu F$
PF	picofarad ($pF = 10^{-6}\mu F = 10^{-12}F$)	10PF = 10pF

- **Capacitance tolerance (for nominal capacitance higher than 10pF)**

Symbol	B	C	D	F	G	J	K	M	N
Tolerance %	±0.1	±0.25	±0.5	±1	±2	±5	±10	±20	±30

Symbol	P	Q	T	U	V	W	X	Y	Z
Tolerance %	+100 0	+30 -10	+50 -10	+75 -10	+20 -10	+100 -10	+40 -20	+150 -10	+80 -20

Ex. 10MF J = $10\mu F$ ±5%

- **Capacitance tolerance (for nominal capacitance lower than 10pF)**

Symbol	B	C	D	F	G
Tolerance pF	±0.1	±0.25	±0.5	±1	±2

Ex. 10PF G = 10pF ± 2pF

3. Resistor (Res)

- **Unit**

Unit		Ex.	
No Mark	Ω	10	10Ω
K	kΩ	10K	10kΩ
M	MΩ	10M	10MΩ
W	Watt	1W	1 Watt

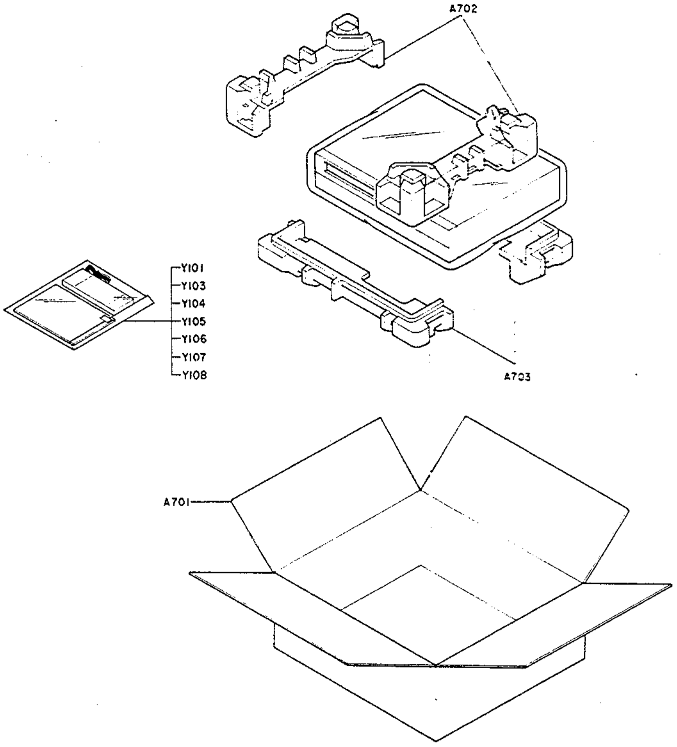
- **Resistance tolerance**

Symbol	B	C	D	F	G	J	K	M
Tolerance %	±0.1	±0.25	±0.5	±1	±2	±5	±10	±20

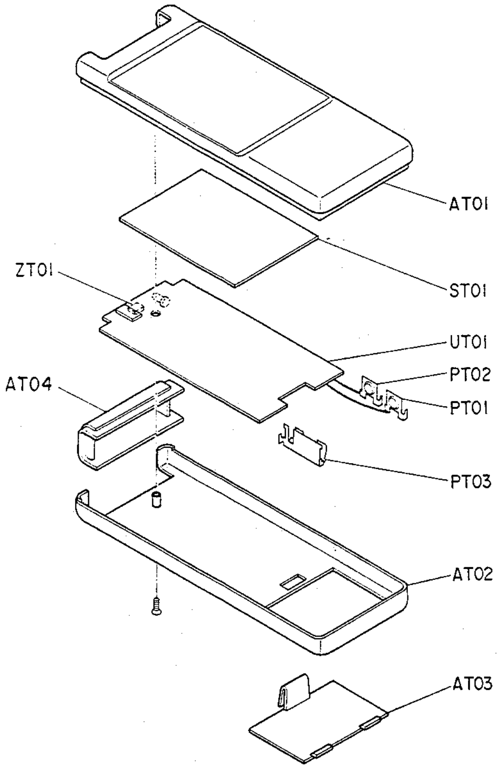
Ex. 470 J = 470Ω ± 5%

1. EXPLODED VIEWS

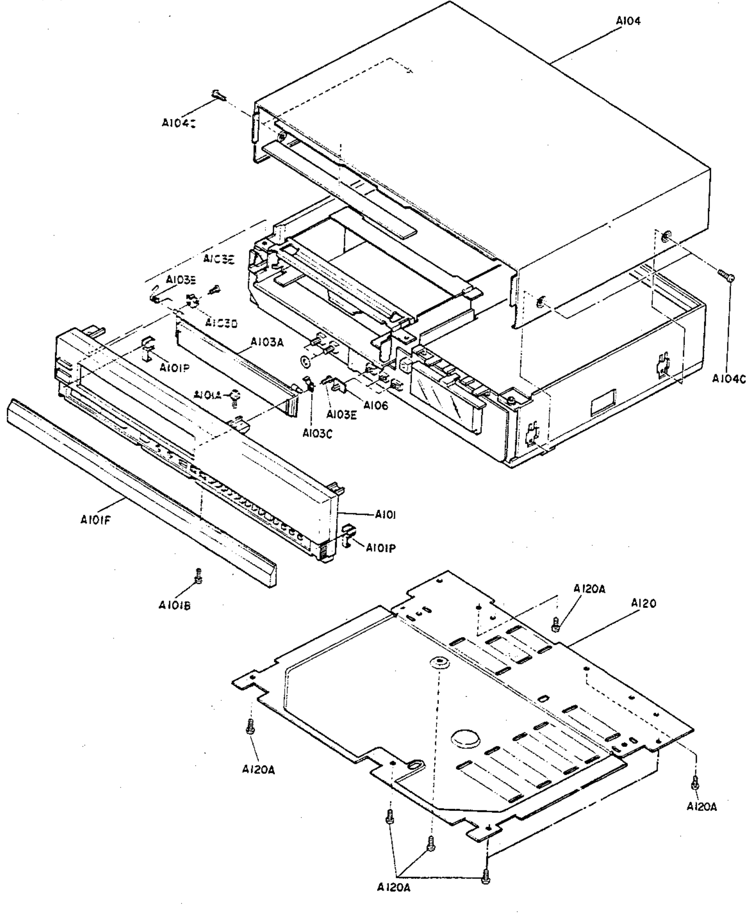
(1) Packing Assembly


A702
Y101
Y103
Y104
Y105
Y106
Y107
Y108
A703
A701

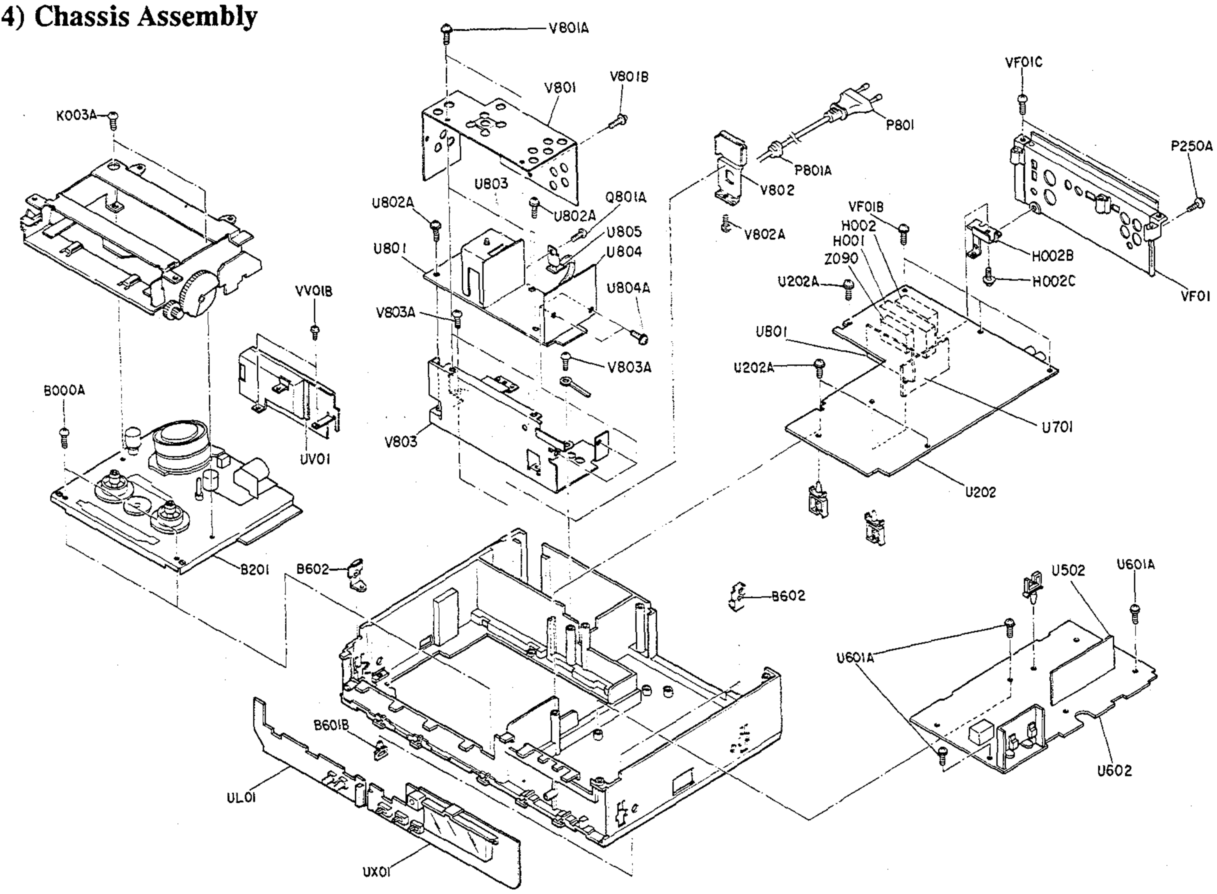
(2) Remote Control Unit


AT01
ST01
ZT01
UT01
PT02
PT01
AT04
PT03
AT02
AT03

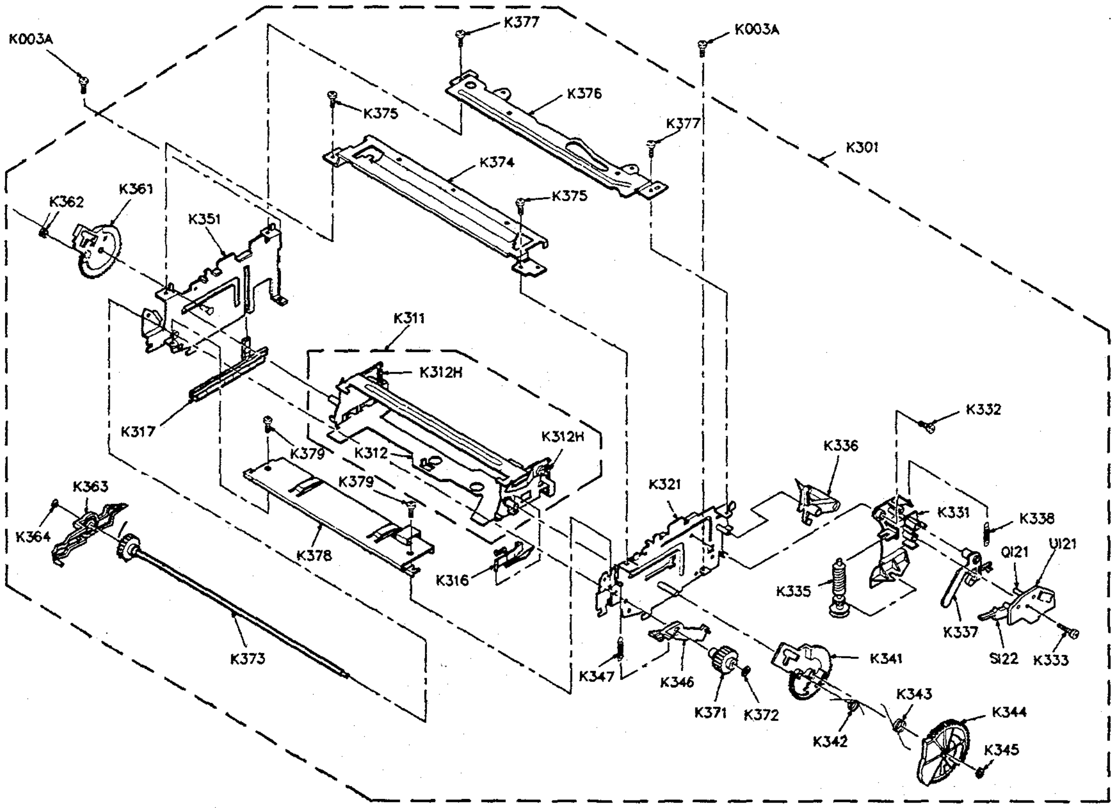
(3) Cabinet Assembly


A104
A104C
A103E
A103E
A103D
A103A
A101P
A101A
A103E
A106
A103C
A104C
A101F
A101
A101P
A101B
A120A
A120
A120A
A120A
A120A

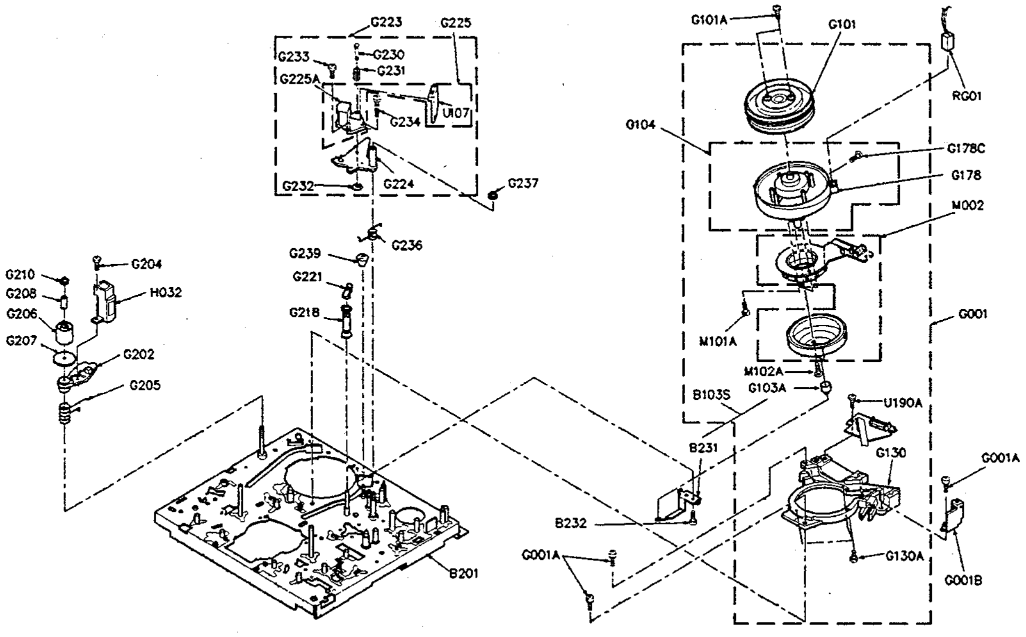
(4) Chassis Assembly


V801A
V801
V801B
K003A
U803
U802A
Q801A
U802A
U805
U804
U801
VV01B
U804A
V803A
V803A
B000A
UV01
V803
B201
B602
B602
B601B
UL01
UX01
V802
P801
P801A
V802A
VF01C
P250A
VF01B
H002
H001
Z090
H002B
H002C
VF01
U202A
U801
U202A
U701
U202
U502
U601A
U601A
U602

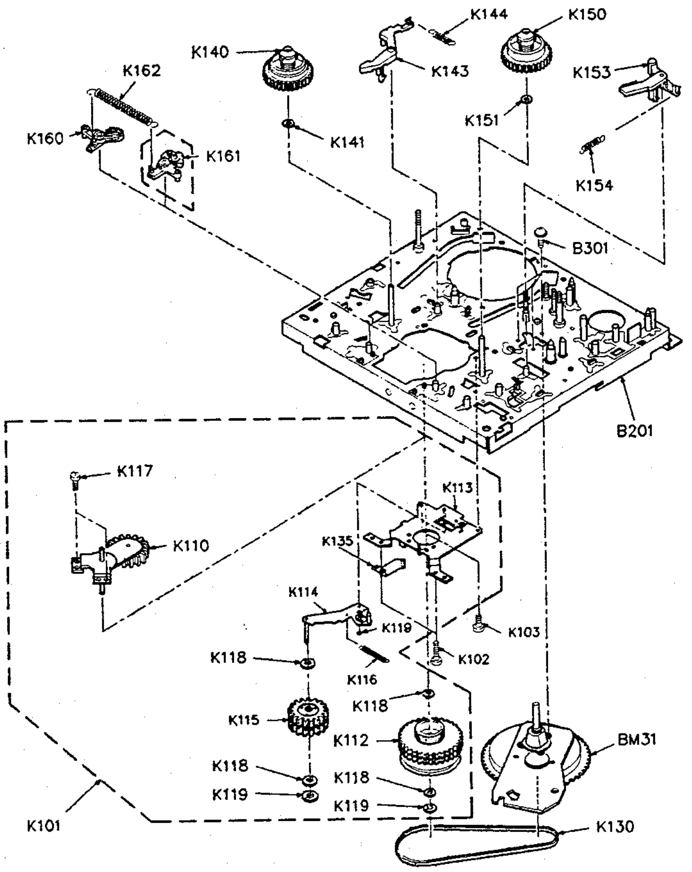
(5) Cassette Holder Assembly


K003A
K377
K003A
K376
K375
K377
K301
K374
K375
K362
K361
K351
K311
K312H
K317
K312H
K379
K312
K379
K321
K336
K332
K331
K338
K363
K364
K378
K316
K335
Q121
U121
K337
S122
K333
K373
K347
K346
K371
K372
K341
K343
K344
K342
K345

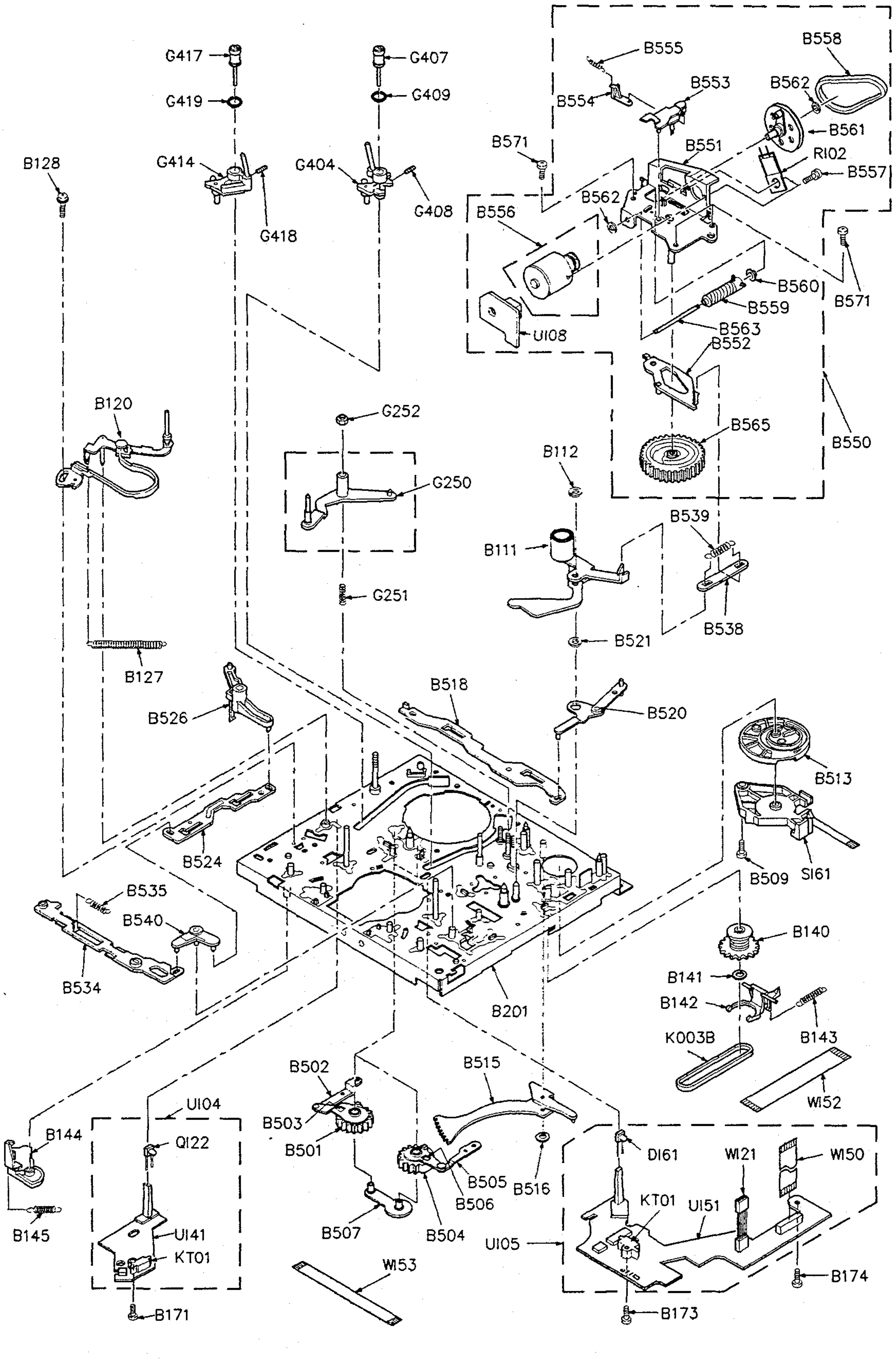
(6) Mechanical Parts (1)


G223
G225
G233
G230
G231
G225A
G234
U107
G232
G224
G237
G236
G239
G221
G218
G210
G208
G206
G207
G204
H032
G202
G205
B201
G101A
G101
RG01
G104
G178C
G178
M002
G001
M101A
M102A
G103A
B103S
U190A
B231
G130
G001A
B232
G001A
G130A
G001B

(7) Mechanical Parts (2)


K144
K150
K140
K162
K143
K153
K151
K160
K161
K141
K154
B301
B201
K117
K113
K110
K135
K114
K119
K103
K118
K102
K116
K118
K115
K112
BM31
K118
K119
K118
K119
K101
K130

(8) Mechanical Parts (3)


G417
G407
G419
G409
G414
G404
G418
G408
B128
B555
B558
B554
B553
B562
B561
B571
B551
RI02
B557
B556
B562
B560
B559
B571
UI08
B563
B552
B565
B550
B120
G252
G250
B112
B539
B111
G251
B538
B521
B127
B526
B518
B520
B513
B524
B509
SI61
B535
B540
B140
B534
B201
B141
B142
B143
K003B
B502
B515
WI52
UI04
B503
B144
QI22
B501
DI61
WI21
WI50
B505
B516
B506
KT01
UI51
B145
UI41
B507
B504
UI05
KT01
WI53
B174
B171
B173

2. PARTS LIST

LOCATION NUMBER	PART NUMBER	DESCRIPTION
		- MECHANICAL PARTS -
A101	70884087	Front Panel
A101A	70391558	Screw
A101F	70868319	Door
A101P	70866631	Door Spring
A103A	70868321	Cassette Door
A103B	70351857	Spring
A103C	70866646	Lock Plate
A103D	70866647	Lock Plate
A103E	70391443	Screw, 2x6mm
A104	70824307	Top Cover
A104C	70391414	Screw, 3x8mm
A106	70826431	Knob
A120	70815204	Bottom Cover
A701	70917539	Case
A702	70921350	Packing (U)
A703	70921351	Packing (B)
A708	70915052	Sheet
AT01	70108671	Case (U)
AT02	70108520	Case (Lower)
AT03	70108521	Case (Battery)
AT04	70108522	Filter
B000A	70391081	Screw, 4x12mm
B111	70323327	Pinch Assy
B112	70396196	Washer, FI 3. 6x8x 0. 5mm
B120	70328360	Tension Regulator Assy
B127	70351944	Spring
B128	23721310	Screw, 3x10mm
B140	70328366	FL Drive Gear Assy
B141	70396284	Washer, 4. 0x1. 6x0. 35mm
B142	70363382	Lever
B143	70351845	Spring
B144	70363383	Lever
B145	70351846	Spring
B171	23712308	Screw, 3x0. 5x8mm
B173	23712308	Screw, 3x0. 5x8mm
B174	70391334	Screw, 3x8mm
B231	70325231	Earth Brush Assy
B232	70391345	Screw, 3x3mm
B501	70333298	Supply Loading Gear
B502	70322431	Link Assy
B503	70351875	Spring
B504	70333329	Take Up Loading Gear
B505	70322432	Link Assy
B506	70351876	Spring
B507	70361335	Cap
B509	70391334	Screw, 3x8mm
B513	70331164	Cam
B515	70322430	Lever Assy
B516	70396196	Washer, FI 3. 6x8x 0. 5mm
B518	70376400	Slider
B520	70323329	Lever Assy
B521	70347034	Polislider 4. 1x 6. 5x 0. 50mm
B524	70376407	Connector
B526	70323340	Cam Lever Assy
B534	70366017	Slider
B535	70351847	Spring
B538	70376408	Connector
B539	70351873	Spring
B540	70363385	Lever
B550	70312231	Loading Drive Assy
B555	70351874	Spring
B556	70312232	Loading Motor Assy
B557	23723304	Screw, 3x4mm
B558	70342131	Belt
B562	70396191	Washer, FI 2. 1x5x 0. 5mm
B571	70391334	Screw, 3x8mm
B601B	70862380	Rubber
BM31	70125291	Motor Assy
G001	70311502	Cylinder Assy C6W4T
G001A	23723308	Screw, 3x8mm
G101	70325437	Upper Cylinder Assy
G101A	70391398	Screw, 2. 6x8mm
G102	70321861	Lower Cylinder Assy
G103	70325171	Earth Cap
G103S	70903022	Earth Brush Kit
G130A	70931409	Screw 2. 6x8mm
G155	23731306	Screw, 3x5x6mm
G178C	70391373	Screw, 2. 6x4mm
G202	70363423	Lever
G205	70351877	Spring
G206	70348229	Inpedance Roller
G207	70368208	Flange
G208	70338172	Sleeve
G210	70393025	NUT, 3x3mm
G218	70379067	Guide Sleeve
G221	70368198	NO. 8 Guide Cap
G224	70328389	ACE Main Base Assy
G225	70182063	ACE Head Sub Assy
G225A	70182097	ACE Sub Base
G230	70378601	Shaft
G231	70351665	Spring
G232	23002250	E-ring
G233	23712308	Screw, 3x0. 5x8mm
G234	70391322	Adjust Screw
G236	70351878	Spring
G237	70393026	Nut, 3x4. 5mm
G239	70392018	Taper Nut
G250	70320239	NO. 9 Guide Lever Assy
G251	70351842	Spring
G252	70393025	NUT, 3x3mm
G404	70322434	Slider Assy
G407	70322438	Roller Assy
G408	70391570	Screw, 2x3mm
G409	70353115	O-ring
G414	70322437	Slider Assy
G417	70322435	Roller Assy
G418	70391570	Screw, 2x3mm
G419	70353115	O-ring
H001	70121091	Tuner, EC431LX1
H002	70123183	RF Modulator MMZ263
H002C	23721305	Screw, 3x5mm
H032A	70183018	FE Head
K003A	23712308	Screw, 3x0. 5x8mm
K003B	70342133	Belt
K102	70391334	Screw, 3x8mm
K103	70391345	Screw, 3x3mm
K110	70326627	Idle Gear Assy
K110K	70351887	Spring
K112	70326644	Clutch Assy
K114	70326646	Gear Lever Assy
K115A	70333302	Gear
K115B	70333301	Gear
K116	70351890	Spring
K117	70391447	Screw, 2. 6x3mm
K118	70396057	Washer, 5. 4x3. 1x0. 5mm
K119	70396193	Washer, FI 2. 6x6x 0. 5mm
K130	70342132	Belt
K135	70373354	Bracket
K140	70327115	S Reel Table Assy
K141	70394200	Spacer
K143	70363424	Lever
K144	70351892	Spring
K150	70327160	Take Up Reel Table Assy
K151	70394200	Spacer
K153	70326648	Reverse Brake Assy
K154	70351893	Spring
K160	70326649	Supply Brake Assy
K161	70326650	Take Up Brake Assy
K162	70351894	Spring
K301	70314306	Front Loading Assy
K312H	70351882	Spring
K317	70366047	Slider
K331	70324409	Bracket
K332	23712308	Screw, 3x0. 5x8mm
K335	70324408	Front Loading Worm Assy
K335C	70338075	Bearing
K335D	70394153	Spacer

LOCATION NUMBER	PART NUMBER	DESCRIPTION	LOCATION NUMBER	PART NUMBER	DESCRIPTION
K336	70363426	Opener			
K337	70363439	Lever			
K338	70351879	Spring			
K341	70333331	Gear			
K342	70351883	Spring			
K343	70351884	Spring			
K344	70333332	Gear			
K345	70396195	Washer,FI 3. 6x6x 0. 5mm			
K346	70363425	Lever			
K347	70351885	Spring			
K361	70333334	Gear			
K362	70351886	Spring			
K363	70363416	Lever			
K364	70396247	Washer, 2. 6x8. 0x0. 5mm			
K371	70333333	Gear			
K372	70396248	Washer, 2. 6x5. 0x0. 5mm			
K373	70324425	Shaft Assy			
K375	23712308	Screw, 3x0. 5x8mm			
K377	23712308	Screw, 3x0. 5x8mm			
K379	23774305	Screw, 3X0. 5X5mm			
M002	70903039	Cylinder Motor			
M101A	70391378	Screw, 2x3mm			
M102A	70391376	Screw			
P101	23902596	Socket, 9P			
P250A	70391440	Screw, 3x10mm			
⚠P801	23176621	Power Cord, 250V, 2. 5A			
⚠P801A	70846155	Cord Holder			
Q810A	23721308	Screw, 3x8mm			
RG01	70213108	Dew Heater			
RI02	70325243	Dew Sensor Assy			
SI61	70145381	Cam Switch Assy			
ST01	70108672	Rubber			
U190A	70391434	Screw, 2. 6x6mm			
U202A	72471082	Screw, 3x10mm			
U602A	72471082	Screw, 3x10mm			
U802A	72471081	Screw, 3x8mm			
U804A	72471081	Screw, 3x8mm			
V801A	72471081	Screw, 3x8mm			
V801B	72471081	Screw, 3x8mm			
V802A	70391355	Screw, 3x8mm			
V803A	70391081	Screw, 4x12mm			
VF01B	72471082	Screw, 3x10mm			
VF01C	72471082	Screw, 3x10mm			
VF01D	23721305	Screw, 3x5mm			
VV01B	70391347	Screw, 2. 6X5mm			
W211A	72471082	Screw, 3x10mm			
W601	70179893	Wire			
WI52	70179391	Wire, FFC			
WI53	70179390	Wire, FFC			
Y101	70971308	Owners Manual			
Y103	70942466	Sheet			
Y104	70933070	Cover			
Y105	23364494	ANT Cable, PAL			
Y106	70148419	Remote Control Unit			
ZT01	23153736	Resonator, CSB455EB20			

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
		- ELECTRICAL PARTS -		
■U202	70188753	P C Board Assy	MAIN	
		- INTEGRATED CIRCUITS -		
IC101	70128007	IC	MC14013BCP	
IC102	70128006	IC	MC14512BCP	
IC201	70128391	IC	AN3247NK	
IC202	B0589735	IC	TL8809P	
IC203	B0325390	IC	TA7347P	
IC204	B0383290	IC	TA8699S	
IC301	70128265	IC	LVA519S	
IC302	70128007	IC	MC14013BCP	
IC303	70128007	IC	MC14013BCP	
IC304	70128382	IC	NJM2234S	
IC306	70128382	IC	NJM2234S	
IC381	70119487	IC	BA7025L	
IC401	B0383780	IC	TA8757N	
IC402	70128382	IC	NJM2234S	
IC403	B0324050	IC	TA7302P	
		- TRANSISTORS -		
Q084	A6012010	Transistor	RN2201	
Q085	A6332430	Transistor	2SC2458-Y	
Q103	A6332430	Transistor	2SC2458-Y	
Q104	A6534430	Transistor	2SA1048-Y	
Q105	A6332430	Transistor	2SC2458-Y	
Q106	A6534430	Transistor	2SA1048-Y	
Q107	A6332430	Transistor	2SC2458-Y	
Q109	A6002040	Transistor	RN1204	
Q110	A6002040	Transistor	RN1204	
Q111	A6002040	Transistor	RN1204	
Q112	A6002040	Transistor	RN1204	
Q113	A6002040	Transistor	RN1204	
Q116	A6534430	Transistor	2SA1048-Y	
Q117	A6534430	Transistor	2SA1048-Y	
Q118	A6002040	Transistor	RN1204	
Q119	A6002040	Transistor	RN1204	
Q120	A6534430	Transistor	2SA1048-Y	
Q121	A6534430	Transistor	2SA1048-Y	
Q122	A6332430	Transistor	2SC2458-Y	
Q123	A6002040	Transistor	RN1204	
Q124	A6002040	Transistor	RN1204	
Q206	A6002030	Transistor	RN1203	
Q207	A6534430	Transistor	2SA1048-Y	
Q208	A6002040	Transistor	RN1204	
Q209	A6534430	Transistor	2SA1048-Y	
Q210	A6002030	Transistor	RN1203	
Q211	A6534430	Transistor	2SA1048-Y	
Q212	A6534430	Transistor	2SA1048-Y	
Q214	A6002040	Transistor	RN1204	
Q215	A6534430	Transistor	2SA1048-Y	
Q217	A6317440	Transistor	2SC1815-Y	
Q218	A6534430	Transistor	2SA1048-Y	
Q219	A6012020	Transistor	RN2202	
Q220	A6332430	Transistor	2SC2458-Y	
Q221	A6002040	Transistor	RN1204	
Q222	A6002040	Transistor	RN1204	
Q223	A6002040	Transistor	RN1204	
Q224	A6002030	Transistor	RN1203	
Q225	A6534430	Transistor	2SA1048-Y	
Q226	A6012040	Transistor	RN2204	
Q307	A6012040	Transistor	RN2204	
Q308	A6332430	Transistor	2SC2458-Y	
Q310	A6332430	Transistor	2SC2458-Y	
Q311	A6332430	Transistor	2SC2458-Y	
Q382	A6002040	Transistor	RN1204	
Q404	A6332430	Transistor	2SC2458-Y	
Q408	A6002040	Transistor	RN1204	
Q409	A6332430	Transistor	2SC2458-Y	
Q410	A6002010	Transistor	RN1201	
Q411	A6332430	Transistor	2SC2458-Y	
Q412	A6012040	Transistor	RN2204	
Q413	A6332430	Transistor	2SC2458-Y	
Q414	A6332430	Transistor	2SC2458-Y	
Q415	A6332430	Transistor	2SC2458-Y	
Q417	A6332430	Transistor	2SC2458-Y	
Q418	A6332430	Transistor	2SC2458-Y	
Q419	A6332430	Transistor	2SC2458-Y	
Q420	A6332430	Transistor	2SC2458-Y	
Q421	A6332430	Transistor	2SC2458-Y	
Q422	A6534430	Transistor	2SA1048-Y	
Q423	A6332430	Transistor	2SC2458-Y	
Q424	A6332430	Transistor	2SC2458-Y	
Q425	A6332540	Transistor	2SC2668-Y	
Q426	A6332540	Transistor	2SC2668-Y	
Q427	A6002040	Transistor	RN1204	
Q428	A6332430	Transistor	2SC2458-Y	
Q429	A6012020	Transistor	RN2202	
Q430	A6332430	Transistor	2SC2458-Y	
Q431	A6332430	Transistor	2SC2458-Y	
Q432	A6002020	Transistor	RN1202	
Q433	A6332430	Transistor	2SC2458-Y	
Q731	A6002030	Transistor	RN1203	
		- DIODES -		
D101	A7160570	Diode	1SS176	
D202	A7160570	Diode	1SS176	
D203	A7160570	Diode	1SS176	
D204	A7160570	Diode	1SS176	
D205	A7160570	Diode	1SS176	
D401	A7160570	Diode	1SS176	
D402	A7160570	Diode	1SS176	
D404	A7160570	Diode	1SS176	
D405	A7160570	Diode	1SS176	
D406	A7160570	Diode	1SS176	
D407	A7160570	Diode	1SS176	
D408	A7160570	Diode	1SS176	
D409	A7160570	Diode	1SS176	
		- COILS -		
L001	23238710	Coil, Peaking	TRF4220AJ	
L101	23289181	Coil, Peaking	TRF4181AF	
L102	23238705	Coil, Peaking	TRF4560AJ	
L103	23237935	Coil, Peaking	TRF4200AC	
L104	23238705	Coil, Peaking	TRF4560AJ	
L105	23238710	Coil, Peaking	TRF4220AJ	
L106	23238710	Coil, Peaking	TRF4220AJ	
L109	23238708	Coil, Peaking	TRF4330AJ	
L110	23238709	Coil, Peaking	TRF4270AJ	
L201	23289220	Coil, Peaking	TRF4220AF	
L202	23289470	Coil, Peaking	TRF4470AF	
L203	23289560	Coil, Peaking	TRF4560AF	
L205	23289101	Coil, Peaking	TRF4101AF	
L206	23289101	Coil, Peaking	TRF4101AF	
L207	23238716	Coil, Peaking	TRF4689AJ	
L208	23289470	Coil, Peaking	TRF4470AF	
L209	23238712	Coil, Peaking	TRF4150AJ	
L210	23238914	Coil, Peaking	TRF4470AC	
L351	70272005	Coil, Resonant	LAA02	
L401	23237984	Coil, Peaking	TRF4180AC	
L402	23289150	Coil, Peaking	TRF4150AF	
L403	23289150	Coil, Peaking	TRF4150AF	
L404	23237805	Coil, Peaking	TRF4222AC	
L405	23289221	Coil, Peaking	TRF4221AF	
L406	23237817	Coil, Peaking	TRF4681AC	
L407	23237967	Coil, Peaking	TRF4471AC	
L408	23237935	Coil, Peaking	TRF4200AC	
		- CAPACITORS -		
C073	24203101	Cap, Electrolytic	100MF	M 16V
C074	24474103	Cap, Ceramic	0.01MF	N 16V
C075	24203101	Cap, Electrolytic	100MF	M 16V
C076	24474103	Cap, Ceramic	0.01MF	N 16V
C079	24797470	Cap, Electrolytic	47MF	M 50V
C081	24206229	Cap, Electrolytic	2.2MF	M 50V
C082	24206229	Cap, Electrolytic	2.2MF	M 50V
C084	24203220	Cap, Electrolytic	22MF	M 16V
C090	24206228	Cap, Electrolytic	0.22MF	M 50V
C091	24474103	Cap, Ceramic	0.01MF	N 16V
C101	24474103	Cap, Ceramic	0.01MF	N 16V
C102	24201470	Cap, Electrolytic	47MF	M 6.3V
C103	24436331	Cap, Ceramic	330PF	J 50V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C104	24436121	Cap, Ceramic	120PF	J 50V
C105	24473330	Cap, Ceramic	33PF	J 50V
C106	24473560	Cap, Ceramic	56PF	J 50V
C107	24473150	Cap, Ceramic	15PF	J 50V
C108	24473270	Cap, Ceramic	27PF	J 50V
C109	24473120	Cap, Ceramic	12PF	J 50V
C110	24473120	Cap, Ceramic	12PF	J 50V
C111	24473220	Cap, Ceramic	22PF	J 50V
C112	24473470	Cap, Ceramic	47PF	J 50V
C113	24474103	Cap, Ceramic	0. 01MF	N 16V
C114	24474103	Cap, Ceramic	0. 01MF	N 16V
C115	24474103	Cap, Ceramic	0. 01MF	N 16V
C117	24474103	Cap, Ceramic	0. 01MF	N 16V
C118	24201470	Cap, Electrolytic	47MF	M 6. 3V
C123	24203470	Cap, Electrolytic	47MF	M 16V
C124	24474103	Cap, Ceramic	0. 01MF	N 16V
C126	24201470	Cap, Electrolytic	47MF	M 6. 3V
C127	24538104	Cap, Plastic	0. 1MF	J 50V
C128	24474103	Cap, Ceramic	0. 01MF	N 16V
C129	24436820	Cap, Ceramic	82PF	J 50V
C130	24473560	Cap, Ceramic	56PF	J 50V
C201	24591682	Cap, Plastic	6800PF	J 50V
C202	24203100	Cap, Electrolytic	10MF	M 16V
C203	24474103	Cap, Ceramic	0. 01MF	N 16V
C204	24206339	Cap, Electrolytic	3. 3MF	M 50V
C205	24203100	Cap, Electrolytic	10MF	M 16V
C206	24436910	Cap, Ceramic	91PF	J 50V
C207	24474103	Cap, Ceramic	0. 01MF	N 16V
C208	24793101	Cap, Electrolytic	100MF	M 10V
C209	24474103	Cap, Ceramic	0. 01MF	N 16V
C210	24206229	Cap, Electrolytic	2. 2MF	M 50V
C211	24474103	Cap, Ceramic	0. 01MF	N 16V
C213	24473270	Cap, Ceramic	27PF	J 50V
C214	24436621	Cap, Ceramic	620PF	J 50V
C215	24473620	Cap, Ceramic	62PF	J 50V
C216	24436820	Cap, Ceramic	82PF	J 50V
C217	24085987	Cap, Electrolytic	4. 7MF	M 16V
C218	24206338	Cap, Electrolytic	0. 33MF	M 50V
C219	24473470	Cap, Ceramic	47PF	J 50V
C221	24473229	Cap, Ceramic	2. 2PF	K 50V
C222	24851223	Cap, Ceramic	0. 022MF	K 25V
C223	24474103	Cap, Ceramic	0. 01MF	N 16V
C224	24474103	Cap, Ceramic	0. 01MF	N 16V
C225	24203470	Cap, Electrolytic	47MF	M 16V
C226	24203220	Cap, Electrolytic	22MF	M 16V
C227	24203220	Cap, Electrolytic	22MF	M 16V
C228	24353101	Cap, Ceramic	100PF	J 50V
C229	24793221	Cap, Electrolytic	220MF	M 10V
C230	24474103	Cap, Ceramic	0. 01MF	N 16V
C231	24206478	Cap, Electrolytic	0. 47MF	M 50V
C232	24206229	Cap, Electrolytic	2. 2MF	M 50V
C233	24474103	Cap, Ceramic	0. 01MF	N 16V
C234	24203220	Cap, Electrolytic	22MF	M 16V
C235	24203470	Cap, Electrolytic	47MF	M 16V
C236	24474103	Cap, Ceramic	0. 01MF	N 16V
C237	24436910	Cap, Ceramic	91PF	J 50V
C238	24202101	Cap, Electrolytic	100MF	M 10V
C239	24793471	Cap, Electrolytic	470MF	M 10V
C240	24474103	Cap, Ceramic	0. 01MF	N 16V
C241	24201470	Cap, Electrolytic	47MF	M 6. 3V
C242	24436820	Cap, Ceramic	82PF	J 50V
C243	24473180	Cap, Ceramic	18PF	J 50V
C244	24206229	Cap, Electrolytic	2. 2MF	M 50V
C245	24206010	Cap, Electrolytic	1MF	M 50V
C246	24085972	Cap, Electrolytic	2. 2MF	M 50V
C247	24474103	Cap, Ceramic	0. 01MF	N 16V
C248	24206010	Cap, Electrolytic	1MF	M 50V
C249	24473510	Cap, Ceramic	51PF	J 50V
C261	24201470	Cap, Electrolytic	47MF	M 6. 3V
C262	24201470	Cap, Electrolytic	47MF	M 6. 3V
C263	24436121	Cap, Ceramic	120PF	J 50V
C265	24473510	Cap, Ceramic	51PF	J 50V
C301	24473680	Cap, Ceramic	68PF	J 50V
C302	24436101	Cap, Ceramic	100PF	J 50V
C303	24851104	Cap, Ceramic	0. 1MF	K 25V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C304	24206010	Cap, Electrolytic	1MF	M 50V
C305	24591223	Cap, Plastic	0. 022MF	J 50V
C306	24593332	Cap	3300PF	
C307	24590561	Cap, Plastic	560PF	J 50V
C308	24474103	Cap, Ceramic	0. 01MF	N 16V
C309	24201470	Cap, Electrolytic	47MF	M 6. 3V
C310	24436101	Cap, Ceramic	100PF	J 50V
C311	24436101	Cap, Ceramic	100PF	J 50V
C312	24474103	Cap, Ceramic	0. 01MF	N 16V
C316	24474103	Cap, Ceramic	0. 01MF	N 16V
C318	24474103	Cap, Ceramic	0. 01MF	N 16V
C319	24474103	Cap, Ceramic	0. 01MF	N 16V
C320	24474103	Cap, Ceramic	0. 01MF	N 16V
C321	24474103	Cap, Ceramic	0. 01MF	N 16V
C322	24474103	Cap, Ceramic	0. 01MF	N 16V
C324	24201470	Cap, Electrolytic	47MF	M 6. 3V
C326	24474103	Cap, Ceramic	0. 01MF	N 16V
C327	24203100	Cap, Electrolytic	10MF	M 16V
C328	24474103	Cap, Ceramic	0. 01MF	N 16V
C329	24474103	Cap, Ceramic	0. 01MF	N 16V
C330	24203100	Cap, Electrolytic	10MF	M 16V
C331	24203100	Cap, Electrolytic	10MF	M 16V
C381	24474102	Cap, Ceramic	1000PF	K 50V
C382	24474102	Cap, Ceramic	1000PF	K 50V
C383	24538223	Cap, Plastic	0. 022MF	J 50V
C384	24203100	Cap, Electrolytic	10MF	M 16V
C385	24206478	Cap, Electrolytic	0. 47MF	M 50V
C386	24474103	Cap, Ceramic	0. 01MF	N 16V
C387	24201470	Cap, Electrolytic	47MF	M 6. 3V
C388	24202330	Cap, Electrolytic	33MF	M 10V
C401	24205479	Cap, Electrolytic	4. 7MF	M 35V
C402	24591223	Cap, Plastic	0. 022MF	J 50V
C404	24436101	Cap, Ceramic	100PF	J 50V
C405	24474103	Cap, Ceramic	0. 01MF	N 16V
C406	24353470	Cap, Ceramic	47PF	J 50V
C407	24353200	Cap, Ceramic	2PF	J 50V
C408	24591202	Cap, Plastic	2000PF	J 50V
C409	24206010	Cap, Electrolytic	1MF	M 50V
C410	24201470	Cap, Electrolytic	47MF	M 6. 3V
C411	24474103	Cap, Ceramic	0. 01MF	N 16V
C412	24206010	Cap, Electrolytic	1MF	M 50V
C413	24206010	Cap, Electrolytic	1MF	M 50V
C414	24474103	Cap, Ceramic	0. 01MF	N 16V
C415	24538563	Cap, Plastic	0. 056MF	J 50V
C416	24474103	Cap, Ceramic	0. 01MF	N 16V
C417	24474103	Cap, Ceramic	0. 01MF	N 16V
C418	24340390	Cap, Ceramic	39PF	J 50V
C419	24473470	Cap, Ceramic	47PF	J 50V
C420	24206010	Cap, Electrolytic	1MF	M 50V
C422	24474103	Cap, Ceramic	0. 01MF	N 16V
C423	24474103	Cap, Ceramic	0. 01MF	N 16V
C424	24474103	Cap, Ceramic	0. 01MF	N 16V
C425	24474103	Cap, Ceramic	0. 01MF	N 16V
C426	24201470	Cap, Electrolytic	47MF	M 6. 3V
C427	24474103	Cap, Ceramic	0. 01MF	N 16V
C428	24474103	Cap, Ceramic	0. 01MF	N 16V
C429	24474103	Cap, Ceramic	0. 01MF	N 16V
C430	24474103	Cap, Ceramic	0. 01MF	N 16V
C431	24474103	Cap, Ceramic	0. 01MF	N 16V
C432	24474103	Cap, Ceramic	0. 01MF	N 16V
C433	24474103	Cap, Ceramic	0. 01MF	N 16V
C434	24474103	Cap, Ceramic	0. 01MF	N 16V
C435	24474103	Cap, Ceramic	0. 01MF	N 16V
C436	24474103	Cap, Ceramic	0. 01MF	N 16V
C437	24474103	Cap, Ceramic	0. 01MF	N 16V
C438	24474103	Cap, Ceramic	0. 01MF	N 16V
C439	24473470	Cap, Ceramic	47PF	J 50V
C440	24474103	Cap, Ceramic	0. 01MF	N 16V
C441	24203100	Cap, Electrolytic	10MF	M 16V
C442	24474103	Cap, Ceramic	0. 01MF	N 16V
C443	24203100	Cap, Electrolytic	10MF	M 16V
C444	24474103	Cap, Ceramic	0. 01MF	N 16V
C445	24474103	Cap, Ceramic	0. 01MF	N 16V
C446	24474103	Cap, Ceramic	0. 01MF	N 16V
C447	24203100	Cap, Electrolytic	10MF	M 16V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C448	24474103	Cap, Ceramic	0.01MF	N 16V
C449	24474103	Cap, Ceramic	0.01MF	N 16V
C451	24093986	Cap, Variable	2. 8MF	
C461	24474103	Cap, Ceramic	0.01MF	N 16V
C462	24474103	Cap, Ceramic	0.01MF	N 16V
C463	24203470	Cap, Electrolytic	47MF	M 16V
C464	24203100	Cap, Electrolytic	10MF	M 16V
C465	24201470	Cap, Electrolytic	47MF	M 6.3V
C466	24436121	Cap, Ceramic	120PF	J 50V
C467	24436820	Cap, Ceramic	82PF	J 50V
C468	24436471	Cap, Ceramic	470PF	J 50V
C469	24538334	Cap, Plastic	0.33MF	J 50V
C470	24201470	Cap, Electrolytic	47MF	M 6.3V
C471	24474103	Cap, Ceramic	0.01MF	N 16V
C472	24474103	Cap, Ceramic	0.01MF	N 16V
C473	24474103	Cap, Ceramic	0.01MF	N 16V
C474	24474103	Cap, Ceramic	0.01MF	N 16V
C475	24201470	Cap, Electrolytic	47MF	M 6.3V
C476	24474103	Cap, Ceramic	0.01MF	N 16V
C477	24436360	Cap, Ceramic	36PF	J 50V
C731	24591153	Cap, Plastic	0. 015MF	J 50V
		- RESISTORS -		
R073	24366472	Res, Carbon	4.7K	J 1/6W
R075	24366472	Res, Carbon	4.7K	J 1/6W
R101	24366122	Res, Carbon	1. 2K	J 1/6W
R102	24366333	Res, Carbon	33K	J 1/6W
R103	24366333	Res, Carbon	33K	J 1/6W
R104	24366821	Res, Carbon	820	J 1/6W
R105	24366102	Res, Carbon	1K	J 1/6W
R106	24366271	Res, Carbon	270	J 1/6W
R107	24366102	Res, Carbon	1K	J 1/6W
R108	24366821	Res, Carbon	820	J 1/6W
R109	24366561	Res, Carbon	560	J 1/6W
R110	24366821	Res, Carbon	820	J 1/6W
R111	24366751	Res, Carbon	750	J 1/6W
R112	24366511	Res, Carbon	510	J 1/6W
R113	24366152	Res, Carbon	1.5K	J 1/6W
R114	24366222	Res, Carbon	2.2K	J 1/6W
R115	24366152	Res, Carbon	1.5K	J 1/6W
R116	24366101	Res, Carbon	100	J 1/6W
R118	24366102	Res, Carbon	1K	J 1/6W
R119	24366471	Res, Carbon	470	J 1/6W
R120	24366333	Res, Carbon	33K	J 1/6W
R121	24366472	Res, Carbon	4.7K	J 1/6W
R122	24366333	Res, Carbon	33K	J 1/6W
R123	24366472	Res, Carbon	4.7K	J 1/6W
R124	24366472	Res, Carbon	4.7K	J 1/6W
R125	24366473	Res, Carbon	47K	J 1/6W
R126	24366333	Res, Carbon	33K	J 1/6W
R127	24366472	Res, Carbon	4.7K	J 1/6W
R128	24366223	Res, Carbon	22K	J 1/6W
R130	24366102	Res, Carbon	1K	J 1/6W
R131	24366272	Res, Carbon	2.7K	J 1/6W
R132	24366122	Res, Carbon	1. 2K	J 1/6W
R135	24366102	Res, Carbon	1K	J 1/6W
R136	24366562	Res, Carbon	5.6K	J 1/6W
R137	24366203	Res, Carbon	20K	J 1/6W
R138	24366303	Res, Carbon	30K	J 1/6W
R139	24366122	Res, Carbon	1. 2K	J 1/6W
R140	24366473	Res, Carbon	47K	J 1/6W
R141	24366472	Res, Carbon	4.7K	J 1/6W
R142	24366821	Res, Carbon	820	J 1/6W
R143	24366821	Res, Carbon	820	J 1/6W
R144	24366102	Res, Carbon	1K	J 1/6W
R145	24366332	Res, Carbon	3.3K	J 1/6W
R146	24366102	Res, Carbon	1K	J 1/6W
R147	24366124	Res, Carbon	120K	J 1/6W
R158	24066954	Res, Variable	2K	
R201	24366392	Res, Carbon	3.9K	J 1/6W
R202	24366163	Res, Carbon	16K	J 1/6W
R203	24366331	Res, Carbon	330	J 1/6W
R204	24366101	Res, Carbon	100	J 1/6W
R205	24366102	Res, Carbon	1K	J 1/6W
R206	24366101	Res, Carbon	100	J 1/6W
R207	24366102	Res, Carbon	1K	J 1/6W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R208	24366562	Res, Carbon	5.6K	J 1/6W
R209	24366103	Res, Carbon	10K	J 1/6W
R210	24366222	Res, Carbon	2.2K	J 1/6W
R211	24366163	Res, Carbon	16K	J 1/6W
R212	24366472	Res, Carbon	4.7K	J 1/6W
R213	24366222	Res, Carbon	2.2K	J 1/6W
R214	24366562	Res, Carbon	5.6K	J 1/6W
R216	24366472	Res, Carbon	4.7K	J 1/6W
R218	24366391	Res, Carbon	390	J 1/6W
R219	24366152	Res, Carbon	1.5K	J 1/6W
R220	24366152	Res, Carbon	1.5K	J 1/6W
R221	24366152	Res, Carbon	1.5K	J 1/6W
R222	24941565	Res, Composition	5.6M	J 1/4W
R224	24366202	Res, Carbon	2K	J 1/6W
R225	24366243	Res, Carbon	24K	J 1/6W
R226	24367222	Res, Carbon	2. 2K	G 1/6W
R227	24367103	Res, Carbon	10K	G 1/6W
R228	24366182	Res, Carbon	1. 8K	J 1/6W
R229	24366682	Res, Carbon	6.8K	J 1/6W
R230	24366103	Res, Carbon	10K	J 1/6W
R231	24366223	Res, Carbon	22K	J 1/6W
R235	24366822	Res, Carbon	8. 2K	J 1/6W
R239	24367563	Res, Carbon	56K	G 1/6W
R240	24366204	Res, Carbon	200K	J 1/6W
R241	24366101	Res, Carbon	100	J 1/6W
R242	24366820	Res, Carbon	82	J 1/6W
R243	24366472	Res, Carbon	4.7K	J 1/6W
R244	24366101	Res, Carbon	100	J 1/6W
R245	24366331	Res, Carbon	330	J 1/6W
R246	24366181	Res, Carbon	180	J 1/6W
R247	24366151	Res, Carbon	150	J 1/6W
R248	24366151	Res, Carbon	150	J 1/6W
R249	24366680	Res, Carbon	68	J 1/6W
R251	24066952	Res, Variable	10K	
R252	24066952	Res, Variable	10K	
R254	24066952	Res, Variable	10K	
R255	24066951	Res, Variable	20K	
R256	24066951	Res, Variable	20K	
R257	24066954	Res, Variable	2K	
R259	24066953	Res, Variable	100K	
R261	24366332	Res, Carbon	3.3K	J 1/6W
R262	24366751	Res, Carbon	750	J 1/6W
R263	24000952	Res, Thermistor	3K	
R264	24366222	Res, Carbon	2.2K	J 1/6W
R265	24366101	Res, Carbon	100	J 1/6W
R266	24366102	Res, Carbon	1K	J 1/6W
R268	24366102	Res, Carbon	1K	J 1/6W
R269	24366473	Res, Carbon	47K	J 1/6W
R270	24366473	Res, Carbon	47K	J 1/6W
R271	24366473	Res, Carbon	47K	J 1/6W
R272	24366473	Res, Carbon	47K	J 1/6W
R273	24366105	Res, Carbon	1M	J 1/6W
R274	24366681	Res, Carbon	680	J 1/6W
R275	24366333	Res, Carbon	33K	J 1/6W
R276	24366103	Res, Carbon	10K	J 1/6W
R278	24366222	Res, Carbon	2.2K	J 1/6W
R279	24366751	Res, Carbon	750	J 1/6W
R280	24366821	Res, Carbon	820	J 1/6W
R281	24366122	Res, Carbon	1. 2K	J 1/6W
R282	24366103	Res, Carbon	10K	J 1/6W
R283	24366203	Res, Carbon	20K	J 1/6W
R301	24366332	Res, Carbon	3.3K	J 1/6W
R302	24366102	Res, Carbon	1K	J 1/6W
R303	24366105	Res, Carbon	1M	J 1/6W
R304	24366103	Res, Carbon	10K	J 1/6W
R305	24366273	Res, Carbon	27K	J 1/6W
R306	24366272	Res, Carbon	2.7K	J 1/6W
R307	24366103	Res, Carbon	10K	J 1/6W
R308	24366562	Res, Carbon	5.6K	J 1/6W
R309	24366101	Res, Carbon	100	J 1/6W
R310	24366361	Res, Carbon	360	J 1/6W
R311	24366361	Res, Carbon	360	J 1/6W
R312	24366361	Res, Carbon	360	J 1/6W
R313	24366752	Res, Carbon	7. 5K	J 1/6W
R314	24366102	Res, Carbon	1K	J 1/6W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R318	24366472	Res, Carbon	4. 7K	J 1/6W
R319	24366472	Res, Carbon	4. 7K	J 1/6W
R320	24366472	Res, Carbon	4. 7K	J 1/6W
R323	24366472	Res, Carbon	4. 7K	J 1/6W
R324	24366472	Res, Carbon	4. 7K	J 1/6W
R325	24366101	Res, Carbon	100	J 1/6W
R326	24366241	Res, Carbon	240	J 1/6W
R327	24366472	Res, Carbon	4. 7K	J 1/6W
R328	24366101	Res, Carbon	100	J 1/6W
R329	24366472	Res, Carbon	4. 7K	J 1/6W
R330	24366101	Res, Carbon	100	J 1/6W
R331	24366223	Res, Carbon	22K	J 1/6W
R332	24366681	Res, Carbon	680	J 1/6W
R333	24366103	Res, Carbon	10K	J 1/6W
R334	24366681	Res, Carbon	680	J 1/6W
R335	24366332	Res, Carbon	3. 3K	J 1/6W
R336	24366102	Res, Carbon	1K	J 1/6W
R337	24366821	Res, Carbon	820	J 1/6W
R355	24066951	Res, Variable	20K	
R359	24066953	Res, Variable	100K	
R381	24366223	Res, Carbon	22K	J 1/6W
R382	24366103	Res, Carbon	10K	J 1/6W
R383	24366102	Res, Carbon	1K	J 1/6W
R384	24366221	Res, Carbon	220	J 1/6W
R385	24366222	Res, Carbon	2. 2K	J 1/6W
R386	24366154	Res, Carbon	150K	J 1/6W
R387	24366152	Res, Carbon	1. 5K	J 1/6W
R388	24366103	Res, Carbon	10K	J 1/6W
R402	24366471	Res, Carbon	470	J 1/6W
R403	24366101	Res, Carbon	100	J 1/6W
R404	24366102	Res, Carbon	1K	J 1/6W
R405	24366103	Res, Carbon	10K	J 1/6W
R409	24366302	Res, Carbon	3K	J 1/6W
R410	24366302	Res, Carbon	3K	J 1/6W
R411	24366153	Res, Carbon	15K	J 1/6W
R412	24366302	Res, Carbon	3K	J 1/6W
R413	24366511	Res, Carbon	510	J 1/6W
R414	24366472	Res, Carbon	4. 7K	J 1/6W
R415	24366202	Res, Carbon	2K	J 1/6W
R416	24366223	Res, Carbon	22K	J 1/6W
R417	24366102	Res, Carbon	1K	J 1/6W
R418	24366222	Res, Carbon	2. 2K	J 1/6W
R419	24366472	Res, Carbon	4. 7K	J 1/6W
R420	24366103	Res, Carbon	10K	J 1/6W
R421	24366103	Res, Carbon	10K	J 1/6W
R422	24366102	Res, Carbon	1K	J 1/6W
R423	24366102	Res, Carbon	1K	J 1/6W
R424	24366102	Res, Carbon	1K	J 1/6W
R425	24366471	Res, Carbon	470	J 1/6W
R426	24366910	Res, Carbon	91	J 1/6W
R427	24366822	Res, Carbon	8. 2K	J 1/6W
R428	24366183	Res, Carbon	18K	J 1/6W
R429	24366271	Res, Carbon	270	J 1/6W
R430	24366132	Res, Carbon	1. 3K	J 1/6W
R431	24366273	Res, Carbon	27K	J 1/6W
R432	24366333	Res, Carbon	33K	J 1/6W
R433	24366821	Res, Carbon	820	J 1/6W
R434	24366511	Res, Carbon	510	J 1/6W
R435	24366153	Res, Carbon	15K	J 1/6W
R437	24366103	Res, Carbon	10K	J 1/6W
R438	24366222	Res, Carbon	2. 2K	J 1/6W
R439	24366272	Res, Carbon	2. 7K	J 1/6W
R440	24366333	Res, Carbon	33K	J 1/6W
R441	24366273	Res, Carbon	27K	J 1/6W
R442	24366821	Res, Carbon	820	J 1/6W
R443	24366103	Res, Carbon	10K	J 1/6W
R444	24366272	Res, Carbon	2. 7K	J 1/6W
R445	24366103	Res, Carbon	10K	J 1/6W
R446	24366682	Res, Carbon	6. 8K	J 1/6W
R447	24366222	Res, Carbon	2. 2K	J 1/6W
R448	24366271	Res, Carbon	270	J 1/6W
R449	24366182	Res, Carbon	1. 8K	J 1/6W
R451	24066955	Res, Variable	1K	
R459	24066956	Res, Variable	500	
R461	24366183	Res, Carbon	18K	J 1/6W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R462	24366103	Res, Carbon	10K	J 1/6W
R463	24366102	Res, Carbon	1K	J 1/6W
R464	24366471	Res, Carbon	470	J 1/6W
R465	24366102	Res, Carbon	1K	J 1/6W
R466	24366102	Res, Carbon	1K	J 1/6W
R467	24366681	Res, Carbon	680	J 1/6W
R468	24366102	Res, Carbon	1K	J 1/6W
R469	24366472	Res, Carbon	4. 7K	J 1/6W
R470	24366473	Res, Carbon	47K	J 1/6W
R471	24366472	Res, Carbon	4. 7K	J 1/6W
R472	24366472	Res, Carbon	4. 7K	J 1/6W
R473	24366223	Res, Carbon	22K	J 1/6W
R474	24366223	Res, Carbon	22K	J 1/6W
R475	24366101	Res, Carbon	100	J 1/6W
R476	24366102	Res, Carbon	1K	J 1/6W
R477	24366390	Res, Carbon	39	J 1/6W
R478	24366332	Res, Carbon	3. 3K	J 1/6W
R479	24366222	Res, Carbon	2. 2K	J 1/6W
R480	24366103	Res, Carbon	10K	J 1/6W
R481	24366184	Res, Carbon	180K	J 1/6W
R482	24366470	Res, Carbon	47	J 1/6W
R483	24366271	Res, Carbon	270	J 1/6W
R484	24366471	Res, Carbon	470	J 1/6W
R485	24366182	Res, Carbon	1. 8K	J 1/6W
R486	24366471	Res, Carbon	470	J 1/6W
R487	24366470	Res, Carbon	47	J 1/6W
R488	24366102	Res, Carbon	1K	J 1/6W
R489	24366103	Res, Carbon	10K	J 1/6W
R490	24366182	Res, Carbon	1. 8K	J 1/6W
R491	24366222	Res, Carbon	2. 2K	J 1/6W
R492	24366182	Res, Carbon	1. 8K	J 1/6W
R493	24366561	Res, Carbon	560	J 1/6W
R494	24366123	Res, Carbon	12K	J 1/6W
R495	24366333	Res, Carbon	33K	J 1/6W
R496	24366101	Res, Carbon	100	J 1/6W
R558	24066604	Res, Variable	200K	
R559	24066604	Res, Variable	200K	
R731	24366563	Res, Carbon	56K	J 1/6W
R732	24366242	Res, Carbon	2. 4K	J 1/6W
R733	24366162	Res, Carbon	1. 6K	J 1/6W
R734	24366302	Res, Carbon	3K	J 1/6W
R735	24366103	Res, Carbon	10K	J 1/6W
R741	24366562	Res, Carbon	5. 6K	J 1/6W
R751	24066952	Res, Variable	10K	
R752	24066948	Res, Variable	200K	
RY97	24366102	Res, Carbon	1K	J 1/6W
RY98	24366102	Res, Carbon	1K	J 1/6W
RY99	24366102	Res, Carbon	1K	J 1/6W
		- MISCELLANEOUS -		
P250	23365627	Phono Jack	4P	
S202	23344082	Switch, Slide		
S203	23145404	Slide Switch, 2C3P		
V204	70867457	Spacer		
X401	23153979	Crystal, 4. 43MHz		
Z201	23107631	Filter, 3. 2MHz, TLC1126N		
Z381	23107980	Filter	4. 5MHz	
Z401	70138128	Filter		
Z402	70138117	Filter		
Z090	70137231	F.U	STD-CZ1	
■U801	70188754	P C Board Assy	CONVERTOR 1	
		- DIODES -		
⚠D801	23118124	Diode (SID BRG)	LB-156 LF-B	
D802	A7568200	Diode	1S1832	
D810	70115449	Diode	S3LA20 (S)	
D811	70115449	Diode	S3LA20 (S)	
D813	A7978850	Diode	S5295G	
		- COILS -		
L801	70211045	Coil, Choke		
		- CAPACITORS -		
⚠C801	70416068	Cap, Plastic	0. 1MF	M 250V
⚠C802	24094653	Cap, Ceramic	220PF	M 400V
⚠C803	24094653	Cap, Ceramic	220PF	M 400V
C804	24086931	Cap, Electrolytic	8200MF	M 450V
C805	24095817	Cap, Plastic	0. 027MF	K 630V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C806	24215101	Cap, Ceramic	100PF	K 1KV
⚠C814	24094655	Cap, Ceramic	1000PF	M 400V
⚠C820	24617884	Cap, Electrolytic	1000MF	M 25V
⚠C822	24617931	Cap, Electrolytic	1200MF	M 10V
C823	24202101	Cap, Electrolytic	100MF	M 10V
C831	24204470	Cap, Electrolytic	47MF	M 25V
C832	24214221	Cap, Ceramic	220PF	K 500V
C833	24214221	Cap, Ceramic	220PF	K 500V
		- RESISTORS -		
R801	24376154	Res, Carbon	150K	J 1/2W
R803	24554563	Res, Oxide Metal	56K	J 2W
R809	24321338	Res, Oxide Metal	0. 33	J 1/2W
R810	24007487	Res, Cement	2. 2	J 2W
⚠R811	24556159	Res, Fusible	1. 5	K 1/2W
⚠R821	24000317	Res, Fusible	1	J 1/4W
		- MISCELLANEOUS -		
⚠F801	23144129	Fuse, 2A		
⚠F801A	23165102	Fuse Holder		
⚠F802	23144970	Fuse, 1. 6A		
⚠F802A	23165102	Fuse Holder		
F803	23144836	Fuse, 125V, 1. 6A		
⚠T801	70213157	Transformer, VPW8901M		
⚠T831	23211864	Coil, Linefilter	TRF3144	
■UL01	70188755	P C Board Assy	LOGIC SW	
		- TRANSISTORS -		
QX05	A6012020	Transistor	RN2202	
		- DIODES -		
DX34	A8606316	Diode, LED	TLG133A-FA	
DX35	A8606316	Diode, LED	TLG133A-FA	
		- RESISTORS -		
R258	24069658	Res, Variable	10K	
R556	24069653	Res, Variable	500K	
RX13	24366910	Res, Carbon	91	J 1/6W
		- MISCELLANEOUS -		
PX01B	23902605	Socket, 12P		
SL02	23344094	Push Switch		
SL03	23344094	Push Switch		
SL05	23344094	Push Switch		
SL06	23344094	Push Switch		
SL07	23344094	Push Switch		
SL08	23344094	Push Switch		
SL09	23344094	Push Switch		
SX20	23344094	Push Switch		
■U502	70188521	P C Board Assy	SERVO 2	
		- INTEGRATED CIRCUITS -		
IC502	70119738	IC	LM2902N	
IC504	70128136	IC	LM2902N	
IC507	B0349250	IC	TA75393S	
		- DIODES -		
D501	23316270	Diode	DA218S	
D503	23316270	Diode	DA218S	
D504	A7160570	Diode	1SS176	
D505	23316270	Diode	DA218S	
D506	23316270	Diode	DA218S	
D509	23316270	Diode	DA218S	
D510	A7151500	Diode	1SS201	
D515	A7151450	Diode	1SS200	
		- CAPACITORS -		
C502	24206010	Cap, Electrolytic	1MF	M 50V
C505	24794470	Cap, Electrolytic	47MF	M 16V
C507	24085987	Cap, Electrolytic	4. 7MF	M 16V
C511	24474103	Cap, Ceramic	0. 01MF	N 16V
C512	24474561	Cap, Ceramic	560PF	K 50V
C513	24473470	Cap, Ceramic	47PF	J 50V
C521	24794470	Cap, Electrolytic	47MF	M 16V
C524	24538224	Cap, Plastic	0. 22MF	J 50V
C527	24538124	Cap, Plastic	0. 12MF	J 50V
C531	24474152	Cap, Ceramic	1500PF	N 50V
C532	24474332	Cap, Ceramic	3300PF	N 16V
C533	24206229	Cap, Electrolytic	2. 2MF	M 50V
C534	24794470	Cap, Electrolytic	47MF	M 16V
C535	24203220	Cap, Electrolytic	22MF	M 16V
C536	24474101	Cap, Ceramic	100PF	K 50V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C538	24474331	Cap, Ceramic	330PF	K 50V
C540	24474103	Cap, Ceramic	0. 01MF	N 16V
C543	24591243	Cap, Plastic	0. 024MF	J 50V
C556	24474271	Cap, Ceramic	270PF	K 50V
C557	24538223	Cap, Plastic	0. 022MF	J 50V
C561	24206229	Cap, Electrolytic	2. 2MF	M 50V
CY09	24203100	Cap, Electrolytic	10MF	M 16V
CY10	24474103	Cap, Ceramic	0. 01MF	N 16V
		- RESISTORS -		
R502	24366182	Res, Carbon	1. 8K	J 1/6W
R503	24366563	Res, Carbon	56K	J 1/6W
R504	24366152	Res, Carbon	1. 5K	J 1/6W
R505	24366122	Res, Carbon	1. 2K	J 1/6W
R506	24366331	Res, Carbon	330	J 1/6W
R507	24366105	Res, Carbon	1M	J 1/6W
R508	24366754	Res, Carbon	750K	J 1/6W
R509	24366105	Res, Carbon	1M	J 1/6W
R510	24366182	Res, Carbon	1. 8K	J 1/6W
R511	24366472	Res, Carbon	4. 7K	J 1/6W
R512	24366104	Res, Carbon	100K	J 1/6W
R513	24366753	Res, Carbon	75K	J 1/6W
R514	24366203	Res, Carbon	20K	J 1/6W
R518	24366472	Res, Carbon	4. 7K	J 1/6W
R519	24366472	Res, Carbon	4. 7K	J 1/6W
R525	24366223	Res, Carbon	22K	J 1/6W
R526	24366222	Res, Carbon	2. 2K	J 1/6W
R528	24366183	Res, Carbon	18K	J 1/6W
R529	24366221	Res, Carbon	220	J 1/6W
R530	24366242	Res, Carbon	2. 4K	J 1/6W
R531	24366362	Res, Carbon	3. 6K	J 1/6W
R537	24366622	Res, Carbon	6. 2K	J 1/6W
R538	24366562	Res, Carbon	5. 6K	J 1/6W
R539	24366562	Res, Carbon	5. 6K	J 1/6W
R540	24366683	Res, Carbon	68K	J 1/6W
R542	24366104	Res, Carbon	100K	J 1/6W
R544	24366752	Res, Carbon	7. 5K	J 1/6W
R549	24366105	Res, Carbon	1M	J 1/6W
R560	24366182	Res, Carbon	1. 8K	J 1/6W
R562	24366333	Res, Carbon	33K	J 1/6W
R564	24366473	Res, Carbon	47K	J 1/6W
R565	24366473	Res, Carbon	47K	J 1/6W
R566	24941275	Res, Composition	2. 7M	J 1/4W
R567	24366392	Res, Carbon	3. 9K	J 1/6W
R568	24366272	Res, Carbon	2. 7K	J 1/6W
R570	24366392	Res, Carbon	3. 9K	J 1/6W
R571	24366822	Res, Carbon	8. 2K	J 1/6W
R572	24366822	Res, Carbon	8. 2K	J 1/6W
R573	24366392	Res, Carbon	3. 9K	J 1/6W
R574	24366392	Res, Carbon	3. 9K	J 1/6W
R575	24366473	Res, Carbon	47K	J 1/6W
R576	24366473	Res, Carbon	47K	J 1/6W
R577	24366164	Res, Carbon	160K	J 1/6W
R578	24366223	Res, Carbon	22K	J 1/6W
R579	24941275	Res, Composition	2. 7M	J 1/4W
R580	24366472	Res, Carbon	4. 7K	J 1/6W
R581	24366472	Res, Carbon	4. 7K	J 1/6W
R582	24366103	Res, Carbon	10K	J 1/6W
R583	24366154	Res, Carbon	150K	J 1/6W
R585	24366623	Res, Carbon	62K	J 1/6W
R587	24366103	Res, Carbon	10K	J 1/6W
R590	24366753	Res, Carbon	75K	J 1/6W
■U203	70188527	P C Board Assy	PRE AMP	
		- INTEGRATED CIRCUITS -		
ICV01	70128390	IC	AN3385NK	
		- TRANSISTORS -		
QV02	A6332430	Transistor	2SC2458-Y	
QV03	A6332430	Transistor	2SC2458-Y	
		- DIODES -		
DV01	A7160570	Diode	1SS176	
		- COILS -		
LV01	23289470	Coil, Peaking	TRF4470AF	
LV02	23289101	Coil, Peaking	TRF4101AF	
LV03	23238705	Coil, Peaking	TRF4560AJ	
LV04	23289271	Coil, Peaking	TRF4271AF	

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
		- CAPACITORS -		
CV01	24206228	Cap, Electrolytic	0.22MF	M 50V
CV02	24538104	Cap, Plastic	0. 1MF	J 50V
CV03	24538104	Cap, Plastic	0. 1MF	J 50V
CV04	24206228	Cap, Electrolytic	0.22MF	M 50V
CV05	24206108	Cap, Electrolytic	0.1MF	M 50V
CV06	24206228	Cap, Electrolytic	0.22MF	M 50V
CV07	24538104	Cap, Plastic	0. 1MF	J 50V
CV08	24538104	Cap, Plastic	0. 1MF	J 50V
CV09	24206108	Cap, Electrolytic	0.1MF	M 50V
CV10	24206228	Cap, Electrolytic	0.22MF	M 50V
CV11	24474103	Cap, Ceramic	0.01MF	N 16V
CV12	24201470	Cap, Electrolytic	47MF	M 6.3V
CV13	24201470	Cap, Electrolytic	47MF	M 6.3V
CV14	24538474	Cap, Plastic	0. 47MF	J 50V
CV15	24436101	Cap, Ceramic	100PF	J 50V
CV16	24851223	Cap, Ceramic	0. 022MF	K 25V
CV17	24538104	Cap, Plastic	0. 1MF	J 50V
CV18	24707685	Cap, Tantalum	6.8MF	M 35V
CV19	24203470	Cap, Electrolytic	47MF	M 16V
CV20	24436101	Cap, Ceramic	100PF	J 50V
CV21	24474103	Cap, Ceramic	0.01MF	N 16V
CV22	24473470	Cap, Ceramic	47PF	J 50V
CV23	24473470	Cap, Ceramic	47PF	J 50V
CV24	24473330	Cap, Ceramic	33PF	J 50V
CV25	24473330	Cap, Ceramic	33PF	J 50V
CV26	24474103	Cap, Ceramic	0.01MF	N 16V
CV27	24436101	Cap, Ceramic	100PF	J 50V
CV28	24436131	Cap, Ceramic	130PF	J 50V
CV29	24474103	Cap, Ceramic	0.01MF	N 16V
CV30	24473680	Cap, Ceramic	68PF	J 50V
CV31	24473470	Cap, Ceramic	47PF	J 50V
CV32	24473680	Cap, Ceramic	68PF	J 50V
CV33	24436820	Cap, Ceramic	82PF	J 50V
		- RESISTORS -		
RV01	24366391	Res, Carbon	390	J 1/6W
RV02	24366471	Res, Carbon	470	J 1/6W
RV03	24366391	Res, Carbon	390	J 1/6W
RV04	24366271	Res, Carbon	270	J 1/6W
RV05	24366471	Res, Carbon	470	J 1/6W
RV06	24366271	Res, Carbon	270	J 1/6W
RV07	24366102	Res, Carbon	1K	J 1/6W
RV08	24366681	Res, Carbon	680	J 1/6W
RV09	24366302	Res, Carbon	3K	J 1/6W
RV10	24366472	Res, Carbon	4.7K	J 1/6W
RV11	24366333	Res, Carbon	33K	J 1/6W
RV12	24366101	Res, Carbon	100	J 1/6W
RV13	24366101	Res, Carbon	100	J 1/6W
RV14	24366102	Res, Carbon	1K	J 1/6W
RV15	24366101	Res, Carbon	100	J 1/6W
RV16	24366102	Res, Carbon	1K	J 1/6W
RV17	24366102	Res, Carbon	1K	J 1/6W
RV18	24366102	Res, Carbon	1K	J 1/6W
RV19	24366183	Res, Carbon	18K	J 1/6W
RV20	24366562	Res, Carbon	5.6K	J 1/6W
RV21	24366124	Res, Carbon	120K	J 1/6W
		- MISCELLANEOUS -		
PV01	23367992	Plug, 9P		
■U602	70188526	P C Board Assy	SUB MAIN	
		- INTEGRATED CIRCUITS -		
IC501	B0273052	IC	TD6372N-E3	
IC503	23119448	IC	AN5560	
IC506	B0349260	IC	TA75393P	
IC508	B0470303	IC	TC4030BP	
IC509	B0470512	IC	TC4051BP	
IC510	B0470512	IC	TC4051BP	
IC511	B0470532	IC	TC4053BP	
IC514	B0475382	IC	TC4538BP	
IC601	70128388	IC	TMP47C860N-P031	
IC602	70128427	IC	TMP47C860N-P028	
IC603	B0320660	IC	TA7291P	
IC604	B0349260	IC	TA75393P	
IC605	70128387	IC	PST572D	
ICX82	70128386	IC	PST572C	

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
		- TRANSISTORS -		
Q512	A6868350	Transistor	2SD1413	
Q513	A6868350	Transistor	2SD1413	
Q515	A6002040	Transistor	RN1204	
Q516	A6002040	Transistor	RN1204	
Q517	A6332430	Transistor	2SC2458-Y	
Q518	A6332430	Transistor	2SC2458-Y	
Q519	A6002040	Transistor	RN1204	
Q520	A6325549	Transistor	2SC2236-Y	
Q523	A6002060	Transistor	RN1206	
Q524	A6012020	Transistor	RN2202	
Q530	A6012040	Transistor	RN2204	
Q540	A6332540	Transistor	2SC2668-Y	
Q541	A6332540	Transistor	2SC2668-Y	
Q542	A6002040	Transistor	RN1204	
Q615	A6534430	Transistor	2SA1048-Y	
Q616	A6533247	Transistor	2SA966-Y	
Q617	A6325549	Transistor	2SC2236-Y	
Q629	A6002020	Transistor	RN1202	
Q630	A6002040	Transistor	RN1204	
Q633	A6002040	Transistor	RN1204	
Q637	A6012060	Transistor	RN2206	
Q641	A6332430	Transistor	2SC2458-Y	
Q642	A6332430	Transistor	2SC2458-Y	
QX81	70153052	IC	LQT60X1	
		- DIODES -		
D081	A7118215	Diode, Zener	04AZ33Y	
D502	A7160570	Diode	1SS176	
D507	A7160570	Diode	1SS176	
D511	A7160570	Diode	1SS176	
D512	A7160570	Diode	1SS176	
D513	A7160570	Diode	1SS176	
D514	A7117325	Diode, Zener	04AZ13Z	
D516	A7117225	Diode, Zener	04AZ12Z	
D603	A7160570	Diode	1SS176	
D609	A7160570	Diode	1SS176	
DX60	A7160570	Diode	1SS176	
		- COILS -		
L501	23237983	Coil, Peaking	TRF4220AC	
L502	23237975	Coil, Peaking	TRF4101AC	
L841	23238653	Coil, Peaking	TRF4470AI	
		- CAPACITORS -		
C085	24797470	Cap, Electrolytic	47MF	M 50V
C501	24794101	Cap, Electrolytic	100MF	M 16V
C503	24474102	Cap, Ceramic	1000PF	K 50V
C504	24538683	Cap, Plastic	0. 068MF	J 50V
C506	24474103	Cap, Ceramic	0.01MF	N 16V
C508	24794101	Cap, Electrolytic	100MF	M 16V
C509	24474102	Cap, Ceramic	1000PF	K 50V
C510	24474332	Cap, Ceramic	3300PF	N 16V
C514	24538683	Cap, Plastic	0. 068MF	J 50V
C515	24538183	Cap, Plastic	0.018MF	J 50V
C516	24206229	Cap, Electrolytic	2. 2MF	M 50V
C517	24591272	Cap, Plastic	2700PF	J 50V
C518	24538224	Cap, Plastic	0.22MF	J 50V
C519	24474102	Cap, Ceramic	1000PF	K 50V
C520	24794470	Cap, Electrolytic	47MF	M 16V
C522	24474103	Cap, Ceramic	0.01MF	N 16V
C525	24474102	Cap, Ceramic	1000PF	K 50V
C526	24474102	Cap, Ceramic	1000PF	K 50V
C528	24474103	Cap, Ceramic	0.01MF	N 16V
C529	24203100	Cap, Electrolytic	10MF	M 16V
C530	24474222	Cap, Ceramic	2200PF	N 16V
C537	24474103	Cap, Ceramic	0.01MF	N 16V
C541	24204100	Cap, Electrolytic	10MF	M 25V
C542	24203220	Cap, Electrolytic	22MF	M 16V
C544	24474103	Cap, Ceramic	0.01MF	N 16V
C545	24474103	Cap, Ceramic	0.01MF	N 16V
C546	24474103	Cap, Ceramic	0.01MF	N 16V
C547	24206478	Cap, Electrolytic	0.47MF	M 50V
C548	24538153	Cap, Plastic	0. 015MF	J 50V
C585	24232103	Cap, Ceramic	0.01MF	Z 50V
C586	24436750	Cap, Ceramic	75PF	J 50V
C587	24474103	Cap, Ceramic	0.01MF	N 16V
C588	24538104	Cap, Plastic	0. 1MF	J 50V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C589	24538104	Cap, Plastic	0. 1MF	J 50V
C590	24202101	Cap, Electrolytic	100MF	M 10V
C601	24201470	Cap, Electrolytic	47MF	M 6. 3V
C602	24206010	Cap, Electrolytic	1MF	M 50V
C604	24473330	Cap, Ceramic	33PF	J 50V
C605	24473330	Cap, Ceramic	33PF	J 50V
C606	24473330	Cap, Ceramic	33PF	J 50V
C607	24473330	Cap, Ceramic	33PF	J 50V
C609	24794101	Cap, Electrolytic	100MF	M 16V
C613	24538104	Cap, Plastic	0. 1MF	J 50V
C620	24232223	Cap, Ceramic	0. 022MF	Z 50V
C621	24232223	Cap, Ceramic	0. 022MF	Z 50V
C623	24474103	Cap, Ceramic	0.01MF	N 16V
C626	24792331	Cap, Electrolytic	330MF	M 6. 3V
C627	24794470	Cap, Electrolytic	47MF	M 16V
C628	24474471	Cap, Ceramic	470PF	K 50V
C640	24474103	Cap, Ceramic	0.01MF	N 16V
C841	24793101	Cap, Electrolytic	100MF	M 10V
CX60	24090979	Cap, Super	0. 047F	Z 5.5V
CX61	24792471	Cap, Electrolytic	470MF	M 6. 3V
CY02	24203220	Cap, Electrolytic	22MF	M 16V
CY03	24206339	Cap, Electrolytic	3. 3MF	M 50V
CY04	24474271	Cap, Ceramic	270PF	K 50V
CY05	24474271	Cap, Ceramic	270PF	K 50V
CY06	24474472	Cap, Ceramic	4700PF	N 16V
CY07	24474102	Cap, Ceramic	1000PF	K 50V
CY08	24474821	Cap, Ceramic	820PF	K 50V
CY11	24538224	Cap, Plastic	0.22MF	J 50V
CY12	24474103	Cap, Ceramic	0.01MF	N 16V
		- RESISTORS -		
R091	24366202	Res, Carbon	2K	J 1/6W
R092	24366202	Res, Carbon	2K	J 1/6W
R501	24552620	Res, Oxide Metal	62	J 1/2W
R515	24366103	Res, Carbon	10K	J 1/6W
R516	24366474	Res, Carbon	470K	J 1/6W
R517	24366221	Res, Carbon	220	J 1/6W
R520	24366684	Res, Carbon	680K	J 1/6W
R521	24366105	Res, Carbon	1M	J 1/6W
R522	24366472	Res, Carbon	4. 7K	J 1/6W
R523	24366472	Res, Carbon	4. 7K	J 1/6W
R527	24366122	Res, Carbon	1. 2K	J 1/6W
R532	24366102	Res, Carbon	1K	J 1/6W
R533	24366102	Res, Carbon	1K	J 1/6W
R534	24366154	Res, Carbon	150K	J 1/6W
R535	24366683	Res, Carbon	68K	J 1/6W
R536	24366102	Res, Carbon	1K	J 1/6W
R541	24366683	Res, Carbon	68K	J 1/6W
R543	24366152	Res, Carbon	1. 5K	J 1/6W
R545	24366683	Res, Carbon	68K	J 1/6W
R547	24366103	Res, Carbon	10K	J 1/6W
R548	24366103	Res, Carbon	10K	J 1/6W
R551	24066617	Res, Variable, Metal	200K	
R552	24066617	Res, Variable, Metal	200K	
R553	24066935	Res, Variable	200K	
R561	24366474	Res, Carbon	470K	J 1/6W
R563	24366472	Res, Carbon	4. 7K	J 1/6W
R569	24366163	Res, Carbon	16K	J 1/6W
R584	24366104	Res, Carbon	100K	J 1/6W
R586	24366153	Res, Carbon	15K	J 1/6W
R588	24366562	Res, Carbon	5. 6K	J 1/6W
R589	24366472	Res, Carbon	4. 7K	J 1/6W
R591	24366513	Res, Carbon	51K	J 1/6W
R592	24366224	Res, Carbon	220K	J 1/6W
R593	24366513	Res, Carbon	51K	J 1/6W
R594	24366244	Res, Carbon	240K	J 1/6W
R595	24366683	Res, Carbon	68K	J 1/6W
R596	24366623	Res, Carbon	62K	J 1/6W
R597	24366394	Res, Carbon	390K	J 1/6W
R598	24366304	Res, Carbon	300K	J 1/6W
R599	24366823	Res, Carbon	82K	J 1/6W
R604	24366473	Res, Carbon	47K	J 1/6W
R608	24366102	Res, Carbon	1K	J 1/6W
R609	24366102	Res, Carbon	1K	J 1/6W
R610	24366472	Res, Carbon	4. 7K	J 1/6W
R611	24366472	Res, Carbon	4. 7K	J 1/6W
R612	24366243	Res, Carbon	24K	J 1/6W
R613	24366103	Res, Carbon	10K	J 1/6W
R614	24366103	Res, Carbon	10K	J 1/6W
R621	24366223	Res, Carbon	22K	J 1/6W
R622	24366223	Res, Carbon	22K	J 1/6W
R623	24366223	Res, Carbon	22K	J 1/6W
R624	24366472	Res, Carbon	4. 7K	J 1/6W
R625	24366102	Res, Carbon	1K	J 1/6W
R626	24366472	Res, Carbon	4. 7K	J 1/6W
R627	24366102	Res, Carbon	1K	J 1/6W
R629	24366822	Res, Carbon	8. 2K	J 1/6W
R631	24366183	Res, Carbon	18K	J 1/6W
R632	24366183	Res, Carbon	18K	J 1/6W
R633	24366103	Res, Carbon	10K	J 1/6W
R634	24366332	Res, Carbon	3. 3K	J 1/6W
R635	24366102	Res, Carbon	1K	J 1/6W
R636	24366222	Res, Carbon	2. 2K	J 1/6W
R637	24366561	Res, Carbon	560	J 1/6W
R640	24366473	Res, Carbon	47K	J 1/6W
R641	24366392	Res, Carbon	3. 9K	J 1/6W
R642	24366392	Res, Carbon	3. 9K	J 1/6W
R661	24366472	Res, Carbon	4. 7K	J 1/6W
R664	24366103	Res, Carbon	10K	J 1/6W
R665	24366103	Res, Carbon	10K	J 1/6W
R666	24366222	Res, Carbon	2. 2K	J 1/6W
R667	24366332	Res, Carbon	3. 3K	J 1/6W
R668	24366682	Res, Carbon	6. 8K	J 1/6W
R669	24366472	Res, Carbon	4. 7K	J 1/6W
R670	24366103	Res, Carbon	10K	J 1/6W
R672	24366102	Res, Carbon	1K	J 1/6W
R673	24366102	Res, Carbon	1K	J 1/6W
R674	24366102	Res, Carbon	1K	J 1/6W
R675	24366223	Res, Carbon	22K	J 1/6W
R676	24366101	Res, Carbon	100	J 1/6W
R677	24366103	Res, Carbon	10K	J 1/6W
R678	24366103	Res, Carbon	10K	J 1/6W
R679	24366103	Res, Carbon	10K	J 1/6W
R680	24366183	Res, Carbon	18K	J 1/6W
R681	24366432	Res, Carbon	4. 3K	J 1/6W
R682	24366432	Res, Carbon	4. 3K	J 1/6W
R683	24366471	Res, Carbon	470	J 1/6W
R684	24366272	Res, Carbon	2. 7K	J 1/6W
R685	24366203	Res, Carbon	20K	J 1/6W
R686	24366134	Res, Carbon	130K	J 1/6W
R687	24366822	Res, Carbon	8. 2K	J 1/6W
R688	24366914	Res, Carbon	910K	J 1/6W
R689	24366304	Res, Carbon	300K	J 1/6W
R690	24366223	Res, Carbon	22K	J 1/6W
R691	24366102	Res, Carbon	1K	J 1/6W
R692	24366102	Res, Carbon	1K	J 1/6W
R693	24366102	Res, Carbon	1K	J 1/6W
R694	24366102	Res, Carbon	1K	J 1/6W
R695	24366102	Res, Carbon	1K	J 1/6W
R696	24366102	Res, Carbon	1K	J 1/6W
R697	24366103	Res, Carbon	10K	J 1/6W
R698	24366103	Res, Carbon	10K	J 1/6W
R699	24366472	Res, Carbon	4. 7K	J 1/6W
RX69	24366301	Res, Carbon	300	J 1/6W
RX75	24366472	Res, Carbon	4. 7K	J 1/6W
RX77	24366151	Res, Carbon	150	J 1/6W
RY01	24366183	Res, Carbon	18K	J 1/6W
RY03	24366563	Res, Carbon	56K	J 1/6W
RY04	24366473	Res, Carbon	47K	J 1/6W
RY05	24366204	Res, Carbon	200K	J 1/6W
RY07	24366364	Res, Carbon	360K	J 1/6W
RY09	24366683	Res, Carbon	68K	J 1/6W
RY10	24366333	Res, Carbon	33K	J 1/6W
RY11	24366222	Res, Carbon	2. 2K	J 1/6W
RY13	24366124	Res, Carbon	120K	J 1/6W
RY14	24366103	Res, Carbon	10K	J 1/6W
RY15	24366473	Res, Carbon	47K	J 1/6W
RY18	24366102	Res, Carbon	1K	J 1/6W
RY38	24366103	Res, Carbon	10K	J 1/6W
RY39	24366222	Res, Carbon	2. 2K	J 1/6W
RY40	24366391	Res, Carbon	390	J 1/6W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RY41	24366151	Res, Carbon	150	J 1/6W
RY42	24366682	Res, Carbon	6.8K	J 1/6W
RY43	24366151	Res, Carbon	150	J 1/6W
RY44	24366473	Res, Carbon	47K	J 1/6W
RY45	24366103	Res, Carbon	10K	J 1/6W
RY46	24366123	Res, Carbon	12K	J 1/6W
RY49	24366151	Res, Carbon	150	J 1/6W
RY50	24366183	Res, Carbon	18K	J 1/6W
RY51	24366472	Res, Carbon	4.7K	J 1/6W
RY70	24000300	Res, Fusible	2.7	J 1/4W
		- MISCELLANEOUS -		
P601	23901261	Socket, 18P		
P603	23901260	Socket, 17P		
Q513C	23721308	Screw, 3x8mm		
X601	23153672	Resonator, TCR1035		
X602	23153672	Resonator, TCR1035		
⚠Z601	23118122	IC Protector, ICP-N5		
⚠Z602	23118122	IC Protector, ICP-N5		
Z801	23107550	DC-DC Converter, CTX006		
⚠Z802	23118132	IC Protector	ICP-N10	
■U701	70188587	P C Board Assy	AUDIO	
		- INTEGRATED CIRCUITS -		
IC701	70119932	IC	BA7765AS	
		- TRANSISTORS -		
Q702	A6319300	Transistor	2SC1959-Y	
		- COILS -		
L701	23237729	Coil, Peaking	TRF4822AP	
L702	23237969	Coil, Peaking	TRF4331AC	
		- CAPACITORS -		
# C701	24436821	Cap, Ceramic	820PF	J 50V
C702	24212332	Cap, Ceramic	3300PF	K 50V
C703	24206479	Cap, Electrolytic	4.7MF	M 50V
# C704	24212101	Cap, Ceramic	100PF	K 50V
C705	24591103	Cap, Plastic	0.01MF	J 50V
C706	24203100	Cap, Electrolytic	10MF	M 16V
C707	24203100	Cap, Electrolytic	10MF	M 16V
C708	24203470	Cap, Electrolytic	47MF	M 16V
C709	24085988	Cap, Electrolytic	1MF	M 50V
C710	24436101	Cap, Ceramic	100PF	J 50V
C711	24436101	Cap, Ceramic	100PF	J 50V
C712	24436201	Cap, Ceramic	200PF	J 50V
C713	24206479	Cap, Electrolytic	4.7MF	M 50V
C714	24591822	Cap, Plastic	8200PF	J 50V
C715	24591183	Cap, Plastic	0.018MF	J 50V
C716	24591203	Cap, Plastic	0.02MF	J 50V
C717	24206010	Cap, Electrolytic	1MF	M 50V
C718	24206010	Cap, Electrolytic	1MF	M 50V
C719	24204330	Cap, Electrolytic	33MF	M 25V
C720	24591103	Cap, Plastic	0.01MF	J 50V
C721	24591103	Cap, Plastic	0.01MF	J 50V
C722	24203470	Cap, Electrolytic	47MF	M 16V
C723	24082049	Cap, Plastic	0.047MF	J 100V
C724	24214221	Cap, Ceramic	220PF	K 500V
C725	24232103	Cap, Ceramic	0.01MF	Z 50V
		- RESISTORS -		
# R701	24360473	Res, Carbon	47K	J 1/8W
# R702	24360511	Res, Carbon	510	J 1/8W
# R703	24360334	Res, Carbon	330K	J 1/8W
# R704	24360221	Res, Carbon	220	J 1/8W
# R705	24360123	Res, Carbon	12K	J 1/8W
# R706	24360562	Res, Carbon	5.6K	J 1/8W
# R707	24360105	Res, Carbon	1M	J 1/8W
# R708	24360272	Res, Carbon	2.7K	J 1/8W
# R709	24360103	Res, Carbon	10K	J 1/8W
# R710	24360513	Res, Carbon	51K	J 1/8W
# R711	24360104	Res, Carbon	100K	J 1/8W
# R712	24360104	Res, Carbon	100K	J 1/8W
# R713	24360273	Res, Carbon	27K	J 1/8W
# R714	24360472	Res, Carbon	4.7K	J 1/8W
# R715	24360392	Res, Carbon	3.9K	J 1/8W
# R716	24360100	Res, Carbon	10	J 1/8W
# R717	24360201	Res, Carbon	200	J 1/8W
# R718	24360562	Res, Carbon	5.6K	J 1/8W
# R719	24360333	Res, Carbon	33K	J 1/8W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
# R720	24360229	Res, Carbon	2.2	J 1/8W
# R721	24360101	Res, Carbon	100	J 1/8W
# R722	24360822	Res, Carbon	8.2K	J 1/8W
		- MISCELLANEOUS -		
T701	23224916	Coil	TLN1069T	
■U803	70188528	P C Board Assy	CONVERTOR 2	
		- TRANSISTORS -		
Q801	23314520	IC(HIC)	STRD1706L902	
		- DIODES -		
D803	23118056	Diode	AG01	
D804	23118056	Diode	AG01	
D805	23118056	Diode	AG01	
D806	23118056	Diode	AG01	
		- CAPACITORS -		
C807	24591472	Cap, Plastic	4700PF	J 50V
C808	24538223	Cap, Plastic	0.022MF	J 50V
C809	24206100	Cap, Electrolytic	10MF	M 50V
C810	24538333	Cap, Plastic	0.033MF	J 50V
C811	24538473	Cap, Plastic	0.047MF	J 50V
C812	24617920	Cap, Electrolytic	120MF	M 25V
C813	24617920	Cap, Electrolytic	120MF	M 25V
		- RESISTORS -		
R802	24376154	Res, Carbon	150K	J 1/2W
R805	24554470	Res, Oxide Metal	47	J 2W
R806	24554470	Res, Oxide Metal	47	J 2W
R807	24552180	Res, Oxide Metal	18	J 1/2W
R808	24366100	Res, Carbon	10	J 1/6W
		- MISCELLANEOUS -		
Q801B	70391355	Screw, 3x8mm		
■U804	70188529	P C Board Assy	REGULATOR	
		- INTEGRATED CIRCUITS -		
IC820	70119737	IC	BA10324	
		- TRANSISTORS -		
Q812	23314141	Transistor	2SC3852	
Q813	A6002020	Transistor	RN1202	
Q814	A6325549	Transistor	2SC2236-Y	
Q815	70114344	Transistor	2SD1198A-Q	
Q816	A6319300	Transistor	2SC1959-Y	
		- DIODES -		
D816	70115421	Diode, Zener	EQA02-05E	
D817	A7160570	Diode	1SS176	
D818	A7160570	Diode	1SS176	
D819	A7160570	Diode	1SS176	
D820	A7160570	Diode	1SS176	
		- CAPACITORS -		
C824	24203220	Cap, Electrolytic	22MF	M 16V
C826	24794470	Cap, Electrolytic	47MF	M 16V
C827	24793101	Cap, Electrolytic	100MF	M 10V
C828	24794470	Cap, Electrolytic	47MF	M 16V
C830	24206010	Cap, Electrolytic	1MF	M 50V
C834	24203220	Cap, Electrolytic	22MF	M 16V
		- RESISTORS -		
R822	24366820	Res, Carbon	82	J 1/6W
R823	24367392	Res, Carbon	3.9K	G 1/6W
R824	24367682	Res, Carbon	6.8K	G 1/6W
R825	24366152	Res, Carbon	1.5K	J 1/6W
R826	24366301	Res, Carbon	300	J 1/6W
R827	24366472	Res, Carbon	4.7K	J 1/6W
R829	24366102	Res, Carbon	1K	J 1/6W
R830	24366471	Res, Carbon	470	J 1/6W
R831	24366104	Res, Carbon	100K	J 1/6W
■U805	70188530	P C Board Assy	POWER TR	
		- TRANSISTORS -		
Q810	23314141	Transistor	2SC3852	
■UB01	70188504	P C Board Assy	PIF SECOND	
		- INTEGRATED CIRCUITS -		
ICB08	B0383400	IC	TA8710S	
		- TRANSISTORS -		
QB01	A6534430	Transistor	2SA1048-Y	
QB02	A6012040	Transistor	RN2204	
QB03	A6332430	Transistor	2SC2458-Y	

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
QB04	A6332430	Transistor	2SC2458-Y	
QB06	A6317440	Transistor	2SC1815-Y	
QB07	A6332430	Transistor	2SC2458-Y	
		- COILS -		
LB01	23238921	Coil, Peaking	TRF4120AC	
LB02	23238914	Coil, Peaking	TRF4470AC	
LB51	23262782	Coil, IF	TRF1108	
LB52	23262739	Coil, IF	TRF1126D	
		- CAPACITORS -		
CB01	24591223	Cap, Plastic	0. 022MF	J 50V
CB02	24591363	Cap, Plastic	0. 036MF	J 50V
CB03	24206010	Cap, Electrolytic	1MF	M 50V
CB04	24203100	Cap, Electrolytic	10MF	M 16V
CB05	24203100	Cap, Electrolytic	10MF	M 16V
CB06	24203100	Cap, Electrolytic	10MF	M 16V
CB07	24473470	Cap, Ceramic	47PF	J 50V
CB08	24473470	Cap, Ceramic	47PF	J 50V
CB09	24474103	Cap, Ceramic	0. 01MF	N 16V
CB11	24474471	Cap, Ceramic	470PF	K 50V
CB12	24474471	Cap, Ceramic	470PF	K 50V
CB13	24474103	Cap, Ceramic	0. 01MF	N 16V
CB14	24474103	Cap, Ceramic	0. 01MF	N 16V
CB15	24203100	Cap, Electrolytic	10MF	M 16V
		- RESISTORS -		
RB01	24366223	Res, Carbon	22K	J 1/6W
RB02	24366104	Res, Carbon	100K	J 1/6W
RB03	24366474	Res, Carbon	470K	J 1/6W
RB04	24366243	Res, Carbon	24K	J 1/6W
RB06	24366103	Res, Carbon	10K	J 1/6W
RB07	24366101	Res, Carbon	100	J 1/6W
RB09	24366222	Res, Carbon	2. 2K	J 1/6W
RB11	24366391	Res, Carbon	390	J 1/6W
RB13	24366103	Res, Carbon	10K	J 1/6W
RB15	24366331	Res, Carbon	330	J 1/6W
RB16	24366331	Res, Carbon	330	J 1/6W
RB17	24366100	Res, Carbon	10	J 1/6W
RB19	24366103	Res, Carbon	10K	J 1/6W
RB20	24366103	Res, Carbon	10K	J 1/6W
RB21	24366222	Res, Carbon	2. 2K	J 1/6W
RB22	24366471	Res, Carbon	470	J 1/6W
RB23	24366471	Res, Carbon	470	J 1/6W
RB24	24366152	Res, Carbon	1. 5K	J 1/6W
RB25	24366223	Res, Carbon	22K	J 1/6W
RB26	24366105	Res, Carbon	1M	J 1/6W
RB27	24366821	Res, Carbon	820	J 1/6W
RB28	24366222	Res, Carbon	2. 2K	J 1/6W
		- MISCELLANEOUS -		
PB01	23367433	Plug, 14P		
XB01	23153900	Resonator, 500KHz, TCR1010		
ZB01	23107949	Filter, Ceramic, 6. 5MHz		
ZB02	23107947	Filter, SIF, 5. 5MHz		
■UX01	70188522	P C Board Assy	TIMER	
		- INTEGRATED CIRCUITS -		
ICX01	70128394	IC	M50957-217SP	
ICX02	70128386	IC	PST572C	
ICX10	70128192	IC	BR93C46	
		- TRANSISTORS -		
QX06	A6332430	Transistor	2SC2458-Y	
		- DIODES -		
DX04	A7160590	Diode	1SS177	
DX07	A7160590	Diode	1SS177	
DX09	A7160590	Diode	1SS177	
DX11	A7160590	Diode	1SS177	
DX13	A7160590	Diode	1SS177	
DX15	A7160590	Diode	1SS177	
DX17	A7160590	Diode	1SS177	
DX19	A7160590	Diode	1SS177	
DX21	A7160590	Diode	1SS177	
DX22	A7160590	Diode	1SS177	
DX24	A7160590	Diode	1SS177	
DX26	A7160590	Diode	1SS177	
DX28	A7160590	Diode	1SS177	
		-- CAPACITORS -		
CX01	24630858	Cap, Electrolytic	47MF	M 10V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CX03	24474101	Cap, Ceramic	100PF	K 50V
CX04	24474101	Cap, Ceramic	100PF	K 50V
CX05	24472100	Cap, Ceramic	10PF	J 50V
CX06	24473300	Cap, Ceramic	30PF	J 50V
CX08	24474103	Cap, Ceramic	0. 01MF	N 16V
CX10	24794470	Cap, Electrolytic	47MF	M 16V
CX11	24474103	Cap, Ceramic	0. 01MF	N 16V
CX29	24474103	Cap, Ceramic	0. 01MF	N 16V
CX30	24474102	Cap, Ceramic	1000PF	K 50V
		- RESISTORS -		
RX01	24366223	Res, Carbon	22K	J 1/6W
RX02	24366223	Res, Carbon	22K	J 1/6W
RX03	24366223	Res, Carbon	22K	J 1/6W
RX04	24366223	Res, Carbon	22K	J 1/6W
RX05	24366103	Res, Carbon	10K	J 1/6W
RX06	24366103	Res, Carbon	10K	J 1/6W
RX07	24366103	Res, Carbon	10K	J 1/6W
RX08	24366103	Res, Carbon	10K	J 1/6W
RX09	24366223	Res, Carbon	22K	J 1/6W
RX10	24366101	Res, Carbon	100	J 1/6W
RX11	24366103	Res, Carbon	10K	J 1/6W
RX12	24366102	Res, Carbon	1K	J 1/6W
RX15	24366221	Res, Carbon	220	J 1/6W
RX16	24366221	Res, Carbon	220	J 1/6W
RX17	24366221	Res, Carbon	220	J 1/6W
RX21	24366102	Res, Carbon	1K	J 1/6W
RX24	24366105	Res, Carbon	1M	J 1/6W
RX25	24941515	Res, Composition	5. 1M	J 1/4W
RX29	24366103	Res, Carbon	10K	J 1/6W
RX30	24366222	Res, Carbon	2. 2K	J 1/6W
RX31	24366101	Res, Carbon	100	J 1/6W
RX32	24366101	Res, Carbon	100	J 1/6W
RX35	24366104	Res, Carbon	100K	J 1/6W
RX36	24941515	Res, Composition	5. 1M	J 1/4W
RX39	24366102	Res, Carbon	1K	J 1/6W
RX40	24366223	Res, Carbon	22K	J 1/6W
RX49	24366223	Res, Carbon	22K	J 1/6W
RX50	24366472	Res, Carbon	4. 7K	J 1/6W
RX51	24366472	Res, Carbon	4. 7K	J 1/6W
RX52	24366472	Res, Carbon	4. 7K	J 1/6W
RX53	24366101	Res, Carbon	100	J 1/6W
RX54	24366101	Res, Carbon	100	J 1/6W
RX56	24366102	Res, Carbon	1K	J 1/6W
RX58	24366101	Res, Carbon	100	J 1/6W
RX60	24366102	Res, Carbon	1K	J 1/6W
RX62	24366473	Res, Carbon	47K	J 1/6W
		- MISCELLANEOUS -		
GX01	70113158	FIP, 11-BT-74GYK		
PX01A	23367716	Plug, 12P		
S204	23145532	Slide Switch, 2C3P		
SX01	23344094	Push Switch		
SX02	23344094	Push Switch		
SX03	23344094	Push Switch		
SX04	23344094	Push Switch		
SX06	23344094	Push Switch		
SX07	23344094	Push Switch		
SX08	23344094	Push Switch		
SX09	23344094	Push Switch		
SX10	23344094	Push Switch		
SX11	23344094	Push Switch		
SX12	23344094	Push Switch		
SX13	23344094	Push Switch		
SX15	23344094	Push Switch		
SX29	23344094	Push Switch		
SX33	23145288	Slide Switch	2C2P	
SX34	23145288	Slide Switch	2C2P	
WX02	70179894	Wire		
WX02A	23902368	FFC, 17P		
XX01	23153744	Resonator, 5MHz, CSA5. 00MG040		
XX02	23153860	Crystal, 32. 768kHz		
ZR01	23120371	F.U	IR-9106-K	
■UI07	70198860	P C Board Assy, ACE HEAD		
		- RESISTORS -		
RI71	24366100	Res, Carbon	10	J 1/6W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
■UI04	70198868	P C Board Assy, MECHA BASE SUB		
		- TRANSISTORS -		
QI22	70114403	Transistor, Photo	PT439F	
QI51	A6090500	Hall Sensor	THS114	
		- MISCELLANEOUS -		
PI41	23902566	FPC, 6P		
SI25	23344089	Push Switch, 1C1P		
■UI05	70198867	P C Board Assy, MECHA BASE MAIN		
		- INTEGRATED CIRCUITS -		
ICI61	B0470212	IC	TC4021	
ICI62	B0349260	IC	TA75393P	
		- TRANSISTORS -		
QI41	A6090500	Hall Sensor	THS114	
		- DIODES -		
DI61	70115450	Diode, LED	GL451V	
		- CAPACITORS -		
CI61	24474103	Cap, Ceramic	0.01MF	N 16V
CI81	24474103	Cap, Ceramic	0.01MF	N 16V
CI82	24474103	Cap, Ceramic	0.01MF	N 16V
CI86	24474103	Cap, Ceramic	0.01MF	N 16V
CI87	24474103	Cap, Ceramic	0.01MF	N 16V
		- RESISTORS -		
RI60	24366472	Res, Carbon	4.7K	J 1/6W
RI61	24366472	Res, Carbon	4.7K	J 1/6W
RI62	24366472	Res, Carbon	4.7K	J 1/6W
RI63	24366472	Res, Carbon	4.7K	J 1/6W
RI65	24366472	Res, Carbon	4.7K	J 1/6W
RI66	24366273	Res, Carbon	27K	J 1/6W
RI67	24366683	Res, Carbon	68K	J 1/6W
RI68	24366472	Res, Carbon	4.7K	J 1/6W
RI70	24366103	Res, Carbon	10K	J 1/6W
RI71	24366103	Res, Carbon	10K	J 1/6W
RI72	24366103	Res, Carbon	10K	J 1/6W
RI73	24366103	Res, Carbon	10K	J 1/6W
RI75	24366103	Res, Carbon	10K	J 1/6W
RI76	24366103	Res, Carbon	10K	J 1/6W
RI77	24366103	Res, Carbon	10K	J 1/6W
RI78	24366103	Res, Carbon	10K	J 1/6W
RI80	24366151	Res, Carbon	150	J 1/6W
RI81	24366561	Res, Carbon	560	J 1/6W
RI82	24366561	Res, Carbon	560	J 1/6W
RI83	24366103	Res, Carbon	10K	J 1/6W
RI84	24366334	Res, Carbon	330K	J 1/6W
RI85	24366103	Res, Carbon	10K	J 1/6W
RI86	24366334	Res, Carbon	330K	J 1/6W
RI87	24366151	Res, Carbon	150	J 1/6W
RI88	24366151	Res, Carbon	150	J 1/6W
RI89	24366151	Res, Carbon	150	J 1/6W
		- MISCELLANEOUS -		
PI51	23901261	Socket, 18P		
PI52	23902570	FPC, 10P		
PI53	23902566	FPC, 6P		
PI54	23902593	FPC, 5P		
WI21	70179392	Wire		
■UI08	70198858	P C Board Assy, LOADING M(T)		
■UI02	70198857	P C Board Assy, FL		
		- TRANSISTORS -		
QI21	70114404	Transistor, Photo	PT361F	
		- MISCELLANEOUS -		
SI22	70145382	FL Switch		
■UT01	23336474	P C Board Assy	Remote Control	

LOCATION NUMBER	PART NUMBER	DESCRIPTION